

# THE IRON AGE

THURSDAY, OCTOBER 3, 1889.

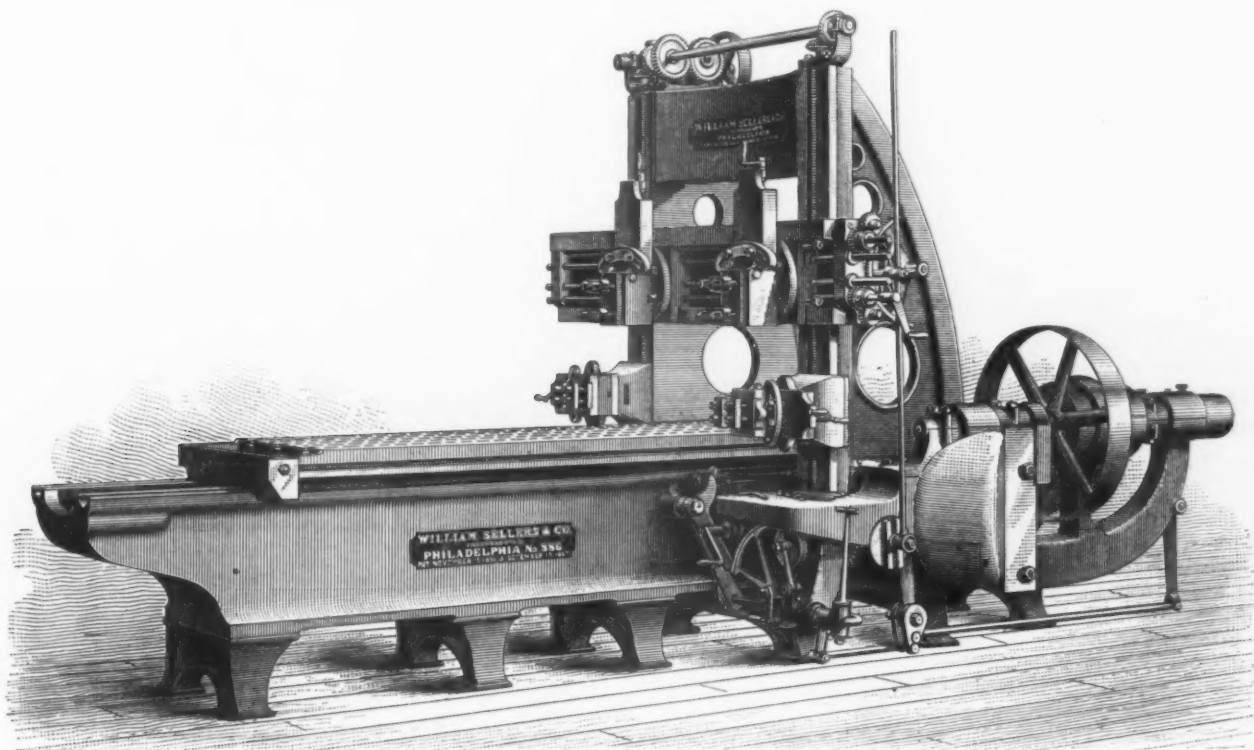
## Spiral-Geared Planing-Machine.

The exhibit of William Sellers & Co. (Incorporated), of Philadelphia, at the Paris Exposition comprises the following: 20-inch and 36-inch planers, 45-inch vertical drill, patent tool-grinding machine, drill grinding and pointing machine, shafting, pulleys, injectors, &c. We illustrate herewith the 36-inch patent spiral-geared planing-machine, which is driven by spiral gearing without the intervention of bevel wheels. The work done is smooth and entirely free from the chatter marks caused by the gearing used in other planing-machines. Driving belts are wide on high face pulleys. The reciprocating motion is produced by friction-clutches, not by shifting belts. The clutches are small in diam-

run past the stops as often as required for examination or adjustment of work, and when the planing is resumed the cut will show no mark of the feed arrest. The cross-head is unusually massive, inclosing the saddles, the slides being broad and flat, not angular, and fitted with bronze taper-shoes to take up the wear. On planers of 36 x 36 feet and larger, when fitted with two saddles on one cross-head, the feed-screws and rods to each are separate, so that each can be operated in all respects independently except in the amount of feed, which will be the same for both saddles; at an additional cost the amount of feed to each saddle can also be made independent. The feed is adjustable from one whole revolution of the feed-screws down to nothing by an infinite gradation, no teeth in feed-

quickness of back stroke, convenience of handling the feed from both sides of the machine, ability to throw feed out and in again without marring the work, great strength, ease in handling, this machine is claimed to stand without a rival. It, like the Sellers old style of planer, stands parallel with the line shaft, economizing room in the shop. Having no shifting-belts from the counter-shaft to the machine, the position of the counter-shaft is not so limited as on the old style of planer.

The Barrow Steel Company, of Barrow, England, have lately put down a hydraulic press for the purpose of working ingots into slabs, instead of using cogging-mills and steam-hammers. The *Iron and Steel*



SPIRAL-GEARED PLANING-MACHINE, BUILT BY WILLIAM SELLERS & CO.

eter but certain in action, reversing the motion without jar. The return-stroke is the quickest ever obtained on a planer without overrunning the required distance and the machine will plane to a shoulder with certainty. The table is of unusual stiffness, with one plane and one very flat angular way, the latter having four bearing surfaces, two to carry the weight and two more to take the side thrust. The table is guided laterally by two surfaces, both nearly vertical, and is free in its motion, running light under heavy loads. Improved oiling devices in the ways, thoroughly protected from dirt. The feed is distinct from the motion of the table; it is driven positively from the slow-running pulley through an appliance for transmitting and arresting motion. It is set in motion by the adjustable stops on the table. The feed takes place while the machine is reversing, and at the end of the back stroke if desired, no matter in which direction the feed is working.

The machine is operated from either side by levers that control the table motion and at the same time can at will cut loose and arrest the feed, so that the table can be

ratchet to limit the changes: 25 x 25 inch planers and larger are fitted with tool-lifter, raising both tools on the back stroke, no matter in which angle the planing tool may be advancing. Vertical slides on both or either upright can be furnished with 36 x 36 inch and larger machines. The tools of the vertical slides stand in line with the main tools operated by separate feed, and can be lowered below the top of table when not in use: 36 x 38 inch planers and larger have lifting machinery for the cross-head which is operated by means of friction-wheels that can be held to their work without much effort, but which stop as soon as the workman releases his hold on the lever, this being to avoid the accidents arising from hoisting-machinery set in motion and then left to work during the absence of the operator. Machines up to 54 x 54 inches inclusive have a return speed eight times greater than the speed of cut, or about 150 feet per minute. Sixty-inch machines and larger have a return speed six times greater than the speed of cut, or about 110 feet per minute. For power of cut, smoothness of work,

*Trades Journal* states that this is the first time that hydraulic plant has been used for this purpose, but it is believed that the result will be satisfactory, and that the metal treated by this process will be found to be more homogeneous than by hammering or cogging. We are advised, however, that Bell Brothers, at Clarence, near Middlesborough, have been using a hydraulic press without securing complete satisfaction. Our contemporary adds that a series of experiments is to be conducted by Mr. David Evans, the general manager of the Barrow company, and several experts have expressed their opinion as to their confidence in the process and the benefit the trade will acquire by its use.

From different parts of the country come complaints of a growing famine in freight rolling stock. While this is a trouble usual at this time of the year, it seems that the fall traffic now is a good deal heavier than it ever has been before, and that even with the additional equipment provided during the current year the leading railroads find it impossible to handle the business offered them.

### Electric Traveling-Cranes at the Paris Exposition.

In our issue of last week we presented an illustrated description of the 10-ton electric traveling-crane constructed by Bon & Lustremant, of Paris. We now publish illustrations (for which we are indebted to the *Engineer*, of London) of the 10-ton electric traveling-crane running on the track on the Ecole Militaire side of the Palais des Machines, and built by Mégy, Echeverria & Bazan, of Paris, who are widely known for their special designs of windlasses and cranes, comprising two different forms of friction-clutch and safety appliances. These clutches are used on the crane, permitting a perfectly gradual starting motion and rendering overloading of the crane impossible. We shall therefore enter somewhat into detail over this interesting part of the mechanism. Another point of great interest is the electrical machines. The dynamo and motor used in this transmission are multipolar machines constructed by the above firm to the designs and patents of M. Georges Miot. These machines, while doing their actual work on the crane daily, are exhibited in Class 62, although there is no separate electrical exhibit; the whole, in fact, forming one system. Although multipolar machines are numerous, this design has certainly some striking features, the more so because without some explanation the *raison d'être* of its peculiar disposition of brushes and field is not easily understood. Further interest attaches to the machine, as the ratio of output to gross weight is exceptionally high—some 12 or 13 watts per pound. Referring first of all to the general construction of the traveling-crane, the general disposition of the mechanism and form of the crane will be seen by the side and end elevations in Figs. 1 and 2. In the latter are seen the three levers for controlling the clutches, the mechanism of which will be described. In the center is the hoisting-gear, which contains a fast and slow motion and a safety-clutch, the action of which is to render impossible the raising of a weight heavier than the predetermined safety limit.

The clutch or coupling devised and constructed by this firm is illustrated in Figs. 3 and 4, in which it will be observed that a sleeve with opposite projecting ears is keyed to the shaft, the projections serving as supports for the pivots of two levers. The extremities of the long arms of these levers are attached to the two free ends of a circular steel spring, the latter being held by levers in a position concentric to the shaft. The spring in general form resembles a piston-ring and its action is in some respects the same, since it is fitted to the inside of a pulley so as normally to press against its interior surface in the same manner as a piston-ring exerts continual pressure round the interior surface of a cylinder. The spring is not circular, but bulges somewhat in its unstrained state, and only assumes the strictly circular form when compressed and fitted inside the pulley. The outside of the spring is also faced with leather, to cause a firm adhesion within the inside face of the pulley. So fitted, therefore, it will be understood that if the shaft is running from some source of power the pulley is fast and runs with it; it therefore only remains to be seen how, when required, the pulley may be set free from the shaft while running. In the figure it will be noticed that the short arms of the levers above mentioned approach each other toward their ends and that a loose roller is fitted to each end. Space enough is left between the two rollers to admit of the insertion of the thin end of a wedge, W, between them. Now, if the wedge is forced in between the two short

arms the two long arms of the levers will approach each other and compress the spring, consequently reducing its reactive adhesion to the pulley, and the latter can be set free entirely from the shaft by forcing the wedge in far enough. It is now easy to see how the wedge is inserted or withdrawn at pleasure while the shaft is running. The wedge is rigidly fixed to a

slip inside the pulley and the machine refuses to lift if the limit of weight is exceeded. It is therefore convenient in many cases to fit the spring alone to a shaft which is to do hoisting work, so as to secure this safety action, the above arrangement of the wedge and collar being added only when it is required to couple and uncouple the gear from the



Fig. 1.

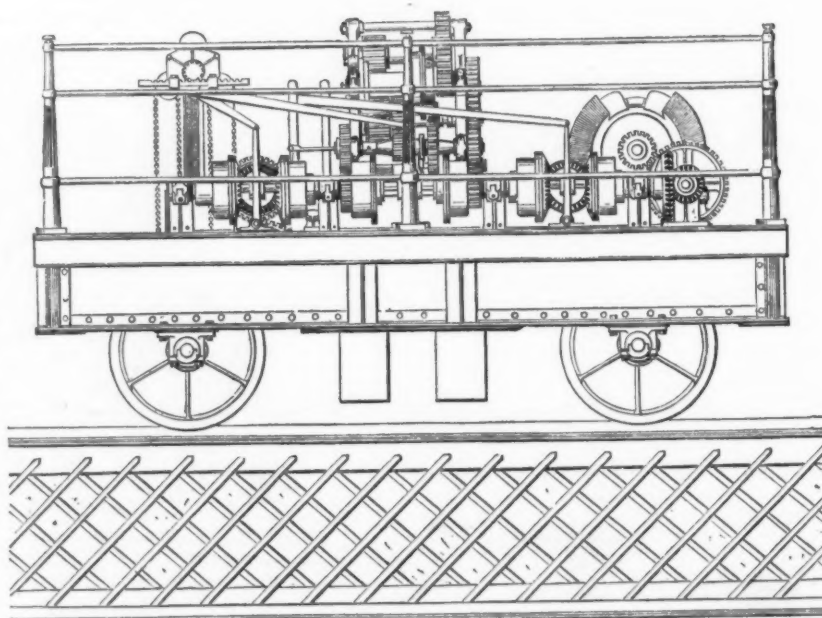


Fig. 2.—End and Side Elevations of Crane.

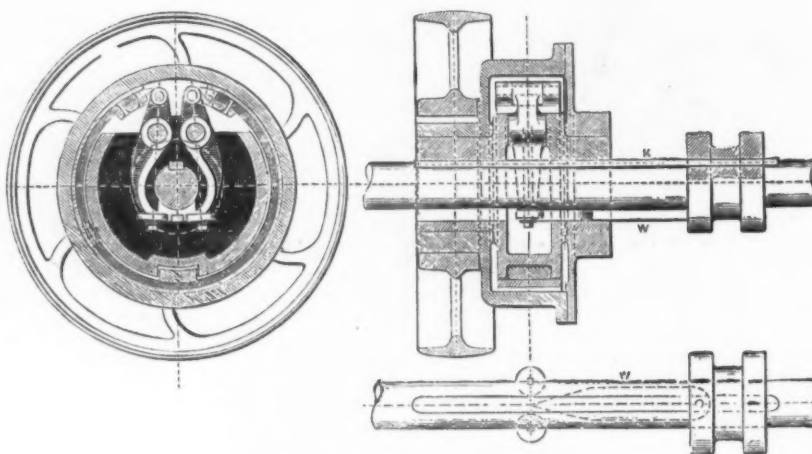


Fig. 3.—Mégy Spring Friction-Clutch.

### TEN-TON ELECTRIC TRAVELING-CRANE AT THE PARIS EXPOSITION.

collar which slides on a feather on the shaft. The collar while rotating can therefore be moved along the direction of the shaft by a fork controlled by a lever placed in any convenient position, and by means of a simple lever-motion the pulley can be made fast or loose with respect to the shaft. Where this form of clutch is supplied to windlasses and cranes there is no danger of lifting a heavier weight than the apparatus will safely bear, as the spring will

power-shaft or to reverse the motion. The hoisting gear on the electric crane is thus fitted—that is, in addition to the reversal of its direction of motion by a nest of bevel gear and two friction-clutches, with their levers and wedges as described, there is added a spring independent of the reversing gear, and mounted on levers and a sleeve as above described, but with no coupling and uncoupling wedge and collar gear, its function being



simply to act as a safety-clutch should the weight exceed the safe limit.

We have already described the wedge-and-collar movement for throwing a pulley in and out of gear with the power-shaft. This is applied to the electric crane to throw either the travel, traverse or hoist movements into gear, or to reverse the direction of either one of them. The next gear to effect this for each of the above movements is shown in Fig. 4, where it will be noticed that each of the two pulleys carries a bevel-wheel set inward, whose teeth gear permanently into those

be easy to follow by reference to the plan given in Fig. 5. It will be seen that the electric motor delivers its power to the main length of shafting through two sets of spur-gearing, reducing the speed twice. In this gear the first reduction of speed is by helical wheels, the two larger wheels in the gear being mortised. The three different movements of the crane, each with their reversals of direction, are controlled by three nests of bevel-wheel gear as described above, the power-shaft lying parallel to the track of the crane. The movement of traverse, or the shifting of the

it being considered that one speed is sufficient for all requirements.

The movement of hoist, or raising and lowering the burden, is controlled from the central nest gear. The details of the hoisting-gear are omitted on the plan, as it could not be well indicated from that point of view without confusion, and can be easily explained. There are two sets of spur-gearing before reaching the final shaft carrying the hoisting-chain, which give respectively speeds in proportion of 1 to 2 and can be thrown into gear for either speed by the lever marked B. This lever shifts a collar with projections fitting into recesses in the boss of either spur-wheel, according to which speed is required, the change being made before the gear is set in motion. In addition to this there is the safety-clutch spring, already described, to prevent the lifting of a load beyond the safe limit. The final connection of the gear with the hoisting-chain will be best understood by the elevation in Fig. 9. At the further end of the crane this chain is anchored, from which point it passes over the two pulleys on the carriage and through the falling block, as shown. Thence it passes round projections on the shaft supplying the power, and up through a semi-circular guide-tube containing projections for the links to hold by, whence the slack chain descends into a wrought-iron box. The movement of travel or the rolling

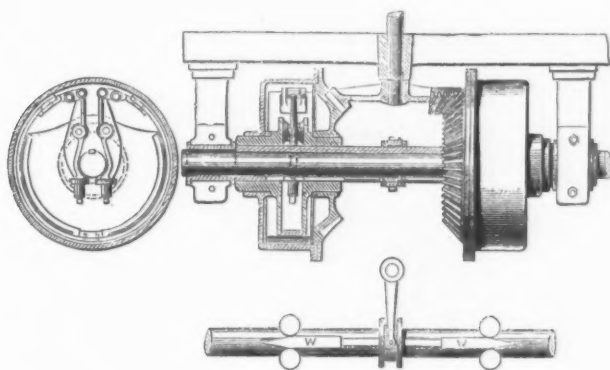


Fig. 4.

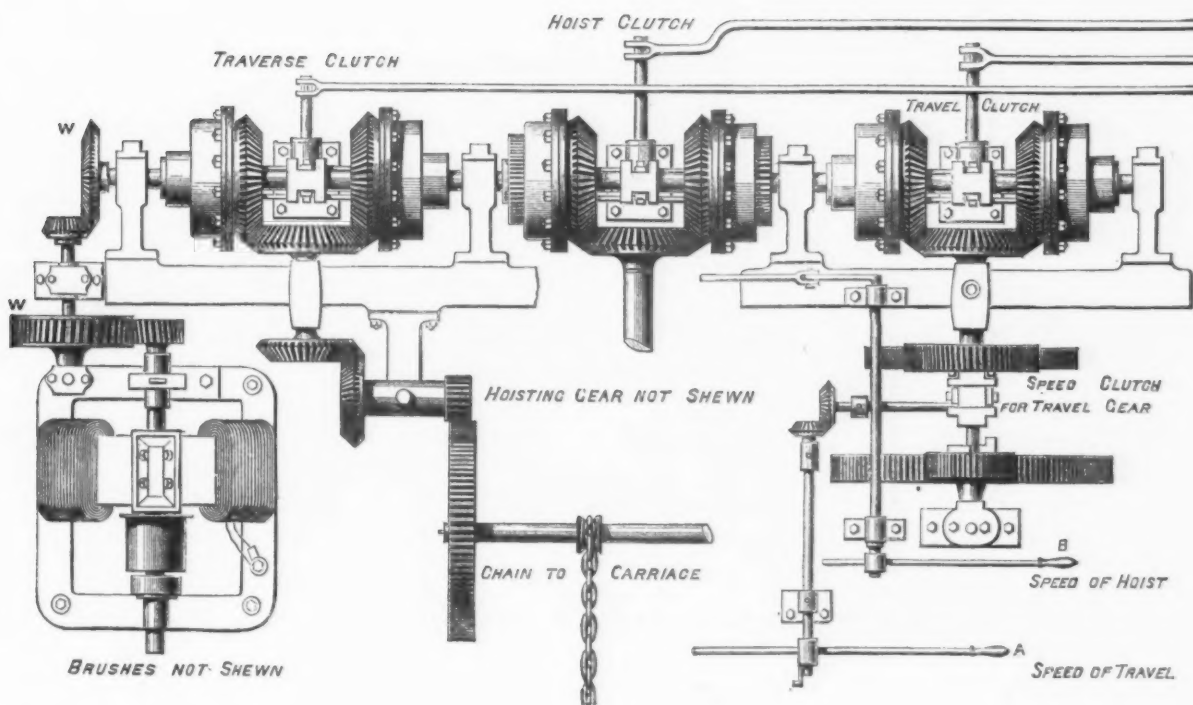


Fig. 5.—General Plan of Mechanism.

#### TEN-TON ELECTRIC TRAVELING-CRANE AT THE PARIS EXPOSITION.

of the intermediate bevel-wheel keyed to the separate-motion shaft. The collar set on a feather on the shaft between the two pulleys carries a double wedge as shown, and can by means of a forked lever be shifted one way or other along the shaft according to the pulley which is required to be thrown into gear with the main shaft. When the collar is midway between the two pulleys the wedges on each side are inserted sufficiently between each pair of levers to compress the springs and allow both pulleys to be loose. To throw one pulley into gear the corresponding wedge is withdrawn by shifting the collar toward the other pulley.

Having described the form of clutch in use on the crane, the mechanism will now

burden across the track, is controlled from the first nest gear. The motion is transmitted from the power-shaft to a shaft at right angles, and this again by level gear transmits the motion to a shaft parallel to the first shaft, and therefore parallel to the track. Finally, the motion is transmitted through a speed-reducing pinion and spur-wheel to the shaft from which the chain is operated. This chain passes over link guides on the shaft, the upper side passing to an anchorage on the carriage and the under side passing round a pulley at the further end of the crane and returning likewise to a fixture on the other side of the carriage. This movement of cross-traverse is not fitted with gear for change of speed,

of the crane bodily along the track is controlled from the nest gear on the right-hand side. The final direction of this motion is, of course, at right angles to the power-shaft, and therefore the only gear is to reduce the speed. Two sets of speed-reducing gear are fitted which are in the ratio of 1 to 2 and can be controlled by the lever A, which operates a clutch similar to that described for the hoist speed-gear. One simple but excellent point about this motion is that the power is transmitted by a length of shafting direct to the center of the crane, from which spur-wheels operate the traveling-motion shaft, so equalizing the torsional strain on the latter and producing a simultaneous and symmetrical propelling effort at each end of the crane.

For throwing each of the three movements in or out of gear in any desired direction the levers are controlled by the mechanism illustrated in Fig. 8. This permits the controlling of the movements from the upper platform of the crane by the direct rotation of the hand-wheels or by endless chains of suitable length passing over each wheel the same may be controlled from any height—that is, either from the working platform or from the ground. The clutch-levers are jointed to the under side of three movable racks placed side by side, the teeth of which are on their upper surfaces. The teeth of each rack gear into pinions keyed to three concentric shafts, the two outside ones being, of course, hollow, so that any pinion may be rotated independently. The central shaft is prolonged and carries the hoist-pinion; the hollow shaft inclosing this carries the travel-pinion and the outside

Two lengths of bare solid silicon bronze conductor are laid along one side of the track, these being connected on at the suffren end of the hall to insulated wires laid underground to the generator plant in the motive-power court. The conductors are laid over porcelain reels fixed by brackets to the girder, and are passed over two insulated brass hooks carried by the crane on its under side, Fig. 10. A constant rubbing contact is therefore established between the bare conductors and the hooks which convey the current to the motor, this contact being assured by the hooks being at a somewhat higher level than the porcelain reels, so causing a slight strain on the wires and lifting them off the reels as the crane passes along.

The motor in use on the crane is a six-pole machine, the field of which is built with three electro-magnets whose poles

therefore of the greatest use in exploring the field passing across narrow air-spaces in a dynamo machine, and has considerably facilitated M. Miot's designs by enabling him to investigate the proportion of useful and waste field in various forms of field magnets in cast-iron, from which it was easy to devise the best form and give the field afterward in wrought-iron. The inductometer, Fig. 7, consists of a U-tube with bulbs and openings as shown for the admission of mercury. Through the plugs in these openings pass wires which make contact with the mercury inside and are connected outside by flexible leads to a battery or dynamo, giving a steady current of two or three amperes strength. The surface of the mercury in each bulb is covered with glycerine for prevention of oxidation. Between the two vertical sides of the tube another tube is fixed, which has an orifice opening into the first, and

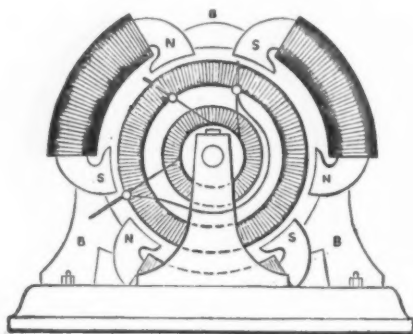


Fig. 6.

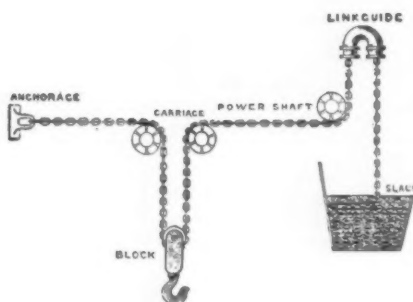


Fig. 9.

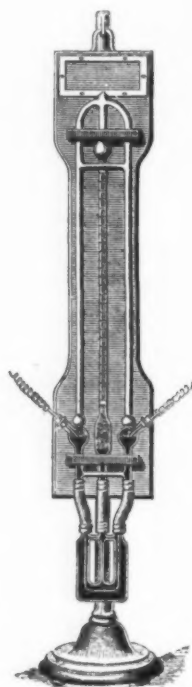


Fig. 7.

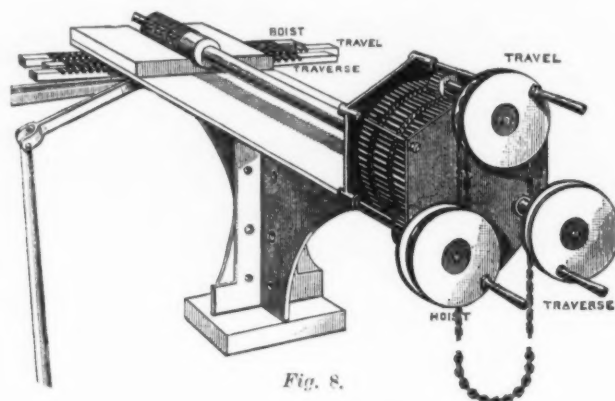


Fig. 8.

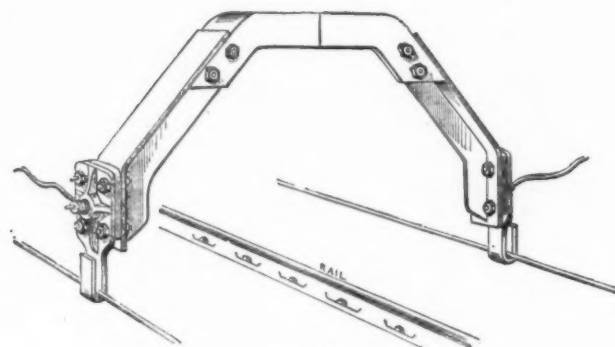


Fig. 10.

#### Details of Mechanism.

#### TEN-TON ELECTRIC TRAVELING-CRANE AT THE PARIS EXPOSITION.

shaft the traverse-pinion. These shafts at the nearer end are respectively keyed to the three toothed wheels of similar size, each of which can be independently operated by a pinion on its individual hand-wheel spindle. As the only movement now used is that of travel for the carrying of passengers from one end of the hall to the other, the chains operating the hand-wheels from the working platform for the other two movements are removed.

We may now discuss the electrical arrangements, first mentioning, however, the interesting fact that the crane when fixed in its final destination after the exhibition will have been worked by four different transmissions of power. It is intended to be finally worked by wire-rope transmission. It is now being worked electrically, and it performed the first two months of its work in the exhibition by steam-power, a small 3 horse-power combined boiler and vertical engine having been fitted on the crane pending the completion of the electrical plant. Moreover, the shafting is arranged for the coupling on of a hand-winch.

are disposed as shown in the illustration, Fig. 6. It will be seen, therefore, that the six poles are arranged in three pairs, each pair being somewhat close together. At first sight there appears to be a chance of considerable leakage across the air-space between poles placed in such proximity, and also a possibility of the magnetic circuit completing itself in one continuous circuit through the iron of the three magnets; that is, only passing through a small portion of the armature core. That these suppositions are purely imaginary is proved by the tests taken of the intermediate field, first with a single and then with two magnets. To describe this test, however, we must first draw attention to the extremely ingenious instrument devised by M. Miot for measuring the intensity of a magnetic field. The instrument, which is called an inductometer, Fig. 7, appears to us to be of great utility, inasmuch as by its means magnetic fields in any direction can be compared and measured even when the magnetized masses between which the field is contained are only separated by a distance of 1 mm. The instrument is

therefore is filled with mercury to the same level as the U-tube. To cut off all connection with the atmosphere the vertical sides are prolonged upward and join on to the central tube at the top.

Immediately above the mercury level in the central bent there is a reservoir of colored spirit, and above this the bore of the tube is very small, so that a slight rise in the level of the mercury produces a considerable rise in the level of the spirit. If, now, the instrument is held in the hand and lowered, so that its lower extremity comes under the action of the magnetic field, the mercury will rise in the central tube, the force with which it is moved being, in fact, proportional to the strength of the current, the intensity of magnet field—resolved at right angles to the plane of the instrument—and the length of the orifice through which the mercury can rise from the U tube into the central tube. This length is evidently the length of conductor acted upon, or rather is the only portion of the conductor upon which the action can take effect, and it is well known that the force with which a



conductor is repelled or attracted in a magnetic field is proportional to its length, the intensity of field and the strength of current it carries. Above we said the mercury would rise, but it is evident that a reversal in the direction of current, field or position of the instrument with respect to the field would cause it to fall. It is of advantage sometimes to see in what direction one portion of a field is with reference to another which is indicated by a rise or fall of the mercury, but generally, for quantitative measurement, the direction of current is arranged so that the mercury is caused to rise. The readings are taken off the spirit capillary-tube scale, this being provided to multiply or amplify the deflections. So far, the instrument serves for comparison of fields. For their exact measurement it is easy to develop the necessary expression; for the force exerted in maintaining above its normal level a certain quantity of mercury must be equal to the weight of the mercury. This is equal to the product of the height raised, the area of orifice and the density of the mercury. Hence we have the strength of field proportional to the height through which the mercury is raised, its density and the area of the orifice, while it is inversely proportional to the strength of current and to the length of the orifice. The constant having been determined once for all in C.G.S. measure, the instrument gives absolute measurements. To give an idea of the range of the instrument, the specimen exhibited will, under the action of a field of 4000 C.G.S. units, indicate a deflection of 20 cm. height with a current of 2 amperes. The lower or active part of the instrument is connected by rubber tubes with the upper portion, so that while the divided scale is held approximately vertical, the lower portion can be used to explore the field in any direction. This is of great convenience and importance, as the instrument only indicates the components of the field resolved at right angles to the plane of the tubes. We have stated above that the smallest size can be made to enter and explore a field in as small a cavity as 1 mm. wide. The instrument serves as a Lippmann ammeter when placed in the field of a permanent or electro magnet.

To return now to the construction of the dynamo. One of the electro-magnets being mounted and separately excited, the field passing through the air-space between one pole and the stationary armature was measured by the inductometer, and a second field limb, unexcited, mounted and moved up toward the first, until the nearest possible position was found without any more than a negligible loss occurring between the two pole-pieces. It was found also that the magnetic circuits due to each limb were distinct and separate. Again, with regard to the disposition of the brushes, if we consider the commutator segments to lie in the same radial line as their respective coils and to neglect for the moment any required lead of the brushes, it is clear that the reversals take place exactly midway between each pair of poles, and therefore the brushes must be set in this position. And in a six-pole machine, which we are now considering, two brushes are only required if all segments separated by  $120^\circ$  are joined. The peculiarity of this machine is, however, that one pair of poles are very close together, while the adjacent pair are wide apart—Fig. 6. Now, in the space between two such poles widely separated there is certainly one central neutral point, but for some distance on each side of this point the field will not change much in intensity. Hence on each side of this central point there are several coils which are not useful in generating an electro-motive force, or so little that it does not even compensate for their dead resistance. Consequently it is

advantageous to cut them out altogether. This is, in fact, what M. Miot does by an additional brush. Instead of one brush at the central point, two are employed, each making contact some distance from the central point and permanently connected together. In the machine, to avoid crowding, one of these brushes is placed on the other side of the commutator, touching, of course, a point at the same potential.

By this arrangement the inactive coils are short-circuited and the main current does not waste energy in passing through them. The motor is series-wound, the three coils of the field being coupled in parallel by a circular brass hoop forming a common connection to them all. The motor absorbs 95 volts and 23 amperes when the crane is carrying its full complement of passengers—120 to 150—and is traveling at 42 m. per minute. Not more than about 3 or 4 horse-power effective is required, although the motor is capable of exerting three times as much. A resistance is inserted in the main circuit and fixed on the working platform of the crane. This is adjustable by a multiple contact switch constructed by M. G. Benard, which is also used to close and open the main circuit.

The generator is a four-pole series machine of the same type as the motor. There is one point of difference, however, the generator field being wound with a layer of fine wire connected as a shunt, for the purpose of preventing demagnetization in the event of any increase in speed of the motor. The maximum output required from the generator is 10,000 watts at 550 revolutions, the driving power being a Mégy 20-horse steam-engine, fitted with cylindrical valves and running at 220 revolutions. These valves consist of two eccentric cylinders, the outside being made to rotate at one-quarter the speed of the shaft by spur-gear. There are four ports in the outside cylinder coming successively into line with the admission ports of the cylinder, while the inside cylinder contains two ports and is normally fixed, but can be rotated through a small angle by hand in this machine to regulate to any required cut-off, steam being admitted through its center.

A small direct-coupled plant of 4½ horse-power, for lighting, is also on exhibit in the generator shed. The engine occupies very little space, being a compound engine with only one cylinder. Steam which has driven the piston down by acting on the rod side is admitted to the other side to drive the piston up. This it does expansively, in consequence of the volume it can occupy being much greater than that on the rod side. Actually, the rod is dispensed with, a large cylindrical tube taking up the space ordinarily occupied by it, and the motion of the piston being delivered directly to the crank-shaft by a connecting-rod inside the tube. The weight of the dynamo and engine combined is 7 hundred-weight and the electrical output 60 amperes and 60 volts at 520 revolutions. A six-pole generator and engine is also fixed in readiness as a spare plant for working the crane. The boilers supplying the engines running the dynamos for both systems of cranes is on the Burbe system, with water-tubes, and constructed by the Société de Chaudronnerie et Fonderies de Liège, Belgium.

As a whole, the system appears to us to possess some prominent advantages, both mechanical and electrical. We are indebted to M. Mégy and the engineer at the exhibition, M. Démange, for pointing out many of the details which would otherwise have escaped our notice. We learn that the firm have installed a 25-ton electric crane for Messrs. Fareot & Co., two of 6 tons each for Marinoni, and one at Mont Luçon of 1500 kg. The hydraulic lifts at either end of the hall, for the con-

venience of passengers traveling on this crane, are also installed by the firm and worked by the city high-pressure water-mains.

### Vibration in Buildings.

One of the most perplexing problems that confronts the engineer is the vibration in buildings caused by running machinery. Westinghouse, Church, Kerr & Co., of New York City, being frequently called on to locate Westinghouse engines on the upper floors of buildings, have had wide experience in this line and have given the subject much thought. In determining these questions they say the character of the building, the ground on which it rests, the weight, power and speed of engines are all factors which must be considered, some of which are very indefinite, or at least their effect is hard to pre-determine, combined with which is the very important influence, namely, the relation which the speed of the engine bears to the natural time of vibration of the floor-beams. It is evident that if the slight motion which every engine has is exactly in time with the natural vibration of the floor-beam each pulsation of the floor-beam will increase the scope of the vibration of the floor, resulting in a most disastrous shaking, while if the pulsations of the engine are in discord with the floor comparative quiet will exist. As floor-beams are usually long and their time of vibration correspondingly long, it is usually found that a fast-running engine will give less of its vibration to the floor-beams than a slow-running one. It is also worthy of note that the vibrations of a fast-running engine are more numerous and less forcible, hence easier resisted by the mass of the floor.

An interesting example of preventing vibration by discord was shown in the case of a Westinghouse 10 horse-power engine which, on an upper story of a silver-ware manufactory, created such a commotion as to rattle the silver-ware on the shelves 100 feet distant. A change of 25 revolutions in the speed, which change was in the direction of increasing the speed, entirely stopped the vibrations.

A most interesting work of this nature, also, is in the great coffee-house of Arbuckle Brothers, in Brooklyn, where two Westinghouse engines of 125 horse-power each and one of 45 horse-power are located on the fifth floor. These engines were erected on the heavy floor-timbers, the floor-boards being cut away and extra timbers being inserted between the joists. Across said timbers were placed oak stringers, which latter had been seasoning since the war in some unfinished vessels in the Brooklyn Navy Yard. On these the engines were mounted with plain fly-wheels, and experiments were conducted to determine the speed at which it would be best to run. It was found that at 204 revolutions the vibration was at the minimum and was very slight, being as little as that caused by any of the ordinary driven machinery. The speed was therefore fixed at this point, and the wheels then made to give the proper belt-speed.

The erection of engines as large as this on upper floors is somewhat novel, and should only be undertaken with full consideration of the surrounding conditions and with engines which are completely balanced.

Commodore Wilson, in pursuance to orders from Secretary Tracy, visited the navy-yard at Portsmouth, N. H., to ascertain the advantages possessed by the yard for establishing an iron plant and a depot for supplies. It is estimated that it will cost \$500,000 to establish an iron plant and construct a new patent dry-dock.

## THE PARIS EXPOSITION.

### Exhibits of French Iron-Makers.

A model of the works of the Société Anonyme des Hauts Fourneaux Forges et Acieries du Saut-du-Tarn accompanies their exhibit of chrome steel, crucible steel, springs, hammers, picks, spades, shovels, scythes and knives, which on the whole is very creditable.

Placed along a side wall is a small collection of samples of pig-iron, ingots, rails, beams and shapes, which, however, represents a concern possessing a position and commanding a future far greater than that of many works with a showier display.

#### THE SOCIÉTÉ DES ACIÉRIES DE LONGWY.

The Longwy Works are specially interesting because they are representative of the plants which with the aid of cheap Minette ores have captured the heavy steel trade since the introduction of the basic process. In 1863 J. Labbé, the creator of the Gorcy Works, began the construction of a plant of three furnaces at Mont-Saint-Martin. In 1864 he, together with Baron O. d'Adelsward, acquired a concession to mine ore, and as the result the latter put up two furnaces at Prieuré, opposite the Mont-Saint-Martin plant. The invention of the basic process, with its manifest importance to the producers of Lorraine, led in 1880 to the consolidation of the two works, Prieuré having previously built a third furnace under the title of La Société des Acieries de Longwy, with a capital of first 15,000,000 francs and later of 20,000,000 francs. The furnaces were remodeled, equipped with Whitwell-Cowper stoves, a seventh stack at Moulaine was purchased, additional mining property was acquired and a large basic steel plant was built. The company own the Mont-Saint-Martin, Herseange, Moulaine and Valleroy mining tracts, and have an interest in those of Hussigny and Godbrange, the statement being made that out of the 2000 hectares the 100 hectares now completely developed can supply 4,000,000 tons of ore. Besides drawing from their own mines, the company work a certain quantity of Luxemburg and local ores and use Bilbao ore to produce special grades of foundry iron. In making basic pig manganiferous ores from different sources are also used. The following analyses are averages of a large number of samples taken on delivery at the furnaces:

	Iron.	Manganese.	Silicon.	Lime.	Alumina.	Sulphur.	Phosphorus.
<b>Longwy:</b>							
Hussigny red....	30	0.20	12.5	8	7	0.20	0.7
Herseange.....	38	0.15	13	8	7	0.30	0.7
Godbrange.....	37	0.15	15	8	7	0.6	0.6
Coulmy.....	42	0.25	17	8	7	0.35	0.6
Hussigny lime....	25	0.15	10	24	55	0.35	0.5
Herseange lime..	36	0.15	10	24	55	0.35	0.5
<b>Luxemburg:</b>							
Sauvage.....	42	0.15	13	6	7	0.05	0.7
Rumelange gray G.....	35	0.08	8	14.5	7	0.05	0.7
Rumelange gray W.....	34	0.08	8	15.5	6.5	0.10	0.6
Rumelange gray K.....	33	0.08	8	17	6.5	0.10	0.6
Rumelange gray P.....	34.5	0.08	8	16	6	0.10	0.6
Rumelange gray B.....	33	0.08	8	17	7	0.10	0.6
Rumelange yellow K.....	38	0.05	5	13	5	0.15	0.6
Schiffange yellow S.....	29.5	0.05	5	22.5	2	0.15	0.6

The limestone used for the furnaces is obtained from Saint-Charles and Bellevue, the former carrying 2.5 per cent. of silica and 3 per cent. of alumina, while the latter has 4 per cent. of silica and 3.25 per cent. of alumina, both containing 52 per cent. of lime. The three Mont-Saint-Martin furnaces are equipped with nine Cowper

stoves, one 18.6 m. (61.4 feet) high and 6.5 m. (21.5 feet) bosh, producing 75 tons a day, while the other, 18.25 x 4.90 m., makes 55 tons. The third is out of blast. Two horizontal condensing Farcot and one vertical Sersaing blowing-engines supply the blast at a pressure of 10 to 11 mm. of mercury, the temperature being carried up to 750° to 800° C. Two of the Prieuré furnaces are 19 m. high, with 6 m. bosh, and make 60 tons a day. They are equipped with seven Whitwell and one Cowper stoves, two Sersaing and one double-acting horizontal Creusot blowing-engines. No. 6 Prieuré, recently remodeled, is 22 m. high, with 7 m. bosh and 480 c. m. capacity. It is served by two old small Whitwell stoves and four of the latest Cowper stoves. Blast is furnished by two vertical Sersaing blowing-engines. The following are analyses of the different grades of pig-iron produced by the furnaces:

Grade.	Manganese.	Carbon.		Silicon.	Sulphur.	Phosphorus.
		Comb.	Graph.			
Special foundry No. 1.	1.30	3.20	0.40	2.70	0.02	0.09
Special foundry No. 2.	1.10	3.05	0.50	2.30	0.04	0.07
Special foundry No. 3.	0.90	3.00	0.60	1.80	0.06	0.06
Special foundry No. 4.	0.85	2.50	1.30	1.40	0.09	0.06
White basic.....	1.50	3.00	0.20	0.04	2.00	0.00
Mottled basic.....	2.00	3.20	0.35	0.02	2.20	0.00

The analyses of basic pig are particularly interesting, since they combine all

Scale.	Tensile strength. Kg. per square mile.	Elongation. Per cent.	Manganese.	Carbon.	Phosphorus.
No. 1, hard.....	75 to 70	12 to 14	0.1 to 1.2	0.3 to 0.35	about 0.1
No. 2, hard.....	70 to 65	14 to 16	0.85 to 1.0	0.26 to 0.3	about 0.1
No. 3, medium....	65 to 60	16 to 18	0.7 to 0.85	0.22 to 0.26	about 0.1
No. 4, medium....	60 to 55	18 to 20	0.6 to 0.7	0.18 to 0.22	about 0.1
No. 5, soft.....	55 to 50	20 to 22	0.5 to 0.6	0.15 to 0.18	0.08 to 0.01
No. 6, soft.....	50 to 46	22 to 24	0.6 to 0.8	0.10 to 0.12	0.08 to 0.01
No. 7, very soft....	46 to 42	24 to 26	0.4 to 0.6	0.09 to 0.1	0.05 to 0.08
No. 8, extra soft....	42 to 38	26 to 28	0.25 to 0.4	0.08 to 0.09	0.05 to 0.08
No. 9, special....	under 38	over 28	0.25 to 0.3	0.08	0.03 to 0.05

the elements which are supposed to represent the ideal of this class of metal—a fair amount of manganese, low silicon, very low sulphur and high phosphorus. The documents from which the above data were taken add the two analyses of iron for ingot-molds—Risdaile, an English iron, with 1.15 manganese, 2.40 silicon and 0.25 phosphorus, and Isbuerge, a French brand, with 2.05 manganese, 2.10 silicon and 0.06 phosphorus.

The following analyses of cinder are of interest in connection with the furnace-work:

	Silica.	Alumina.	Protoxide of iron.	Protoxide of manganese.	Lime.	Sulphur.
Vitreous basic.....	32.5	16.5	1.4	1.6	46.0	0.8
White basic.....	31.4	14.4	0.9	1.1	50.0	1.1
Yellow basic.....	31.5	14.9	2.6	1.5	48.5	1.3
Black basic.....	32.2	15.0	3.0	2.4	45.0	1.4
Foundry.....	35.0	17.0	1.3	1.3	46.5	1.4
Foundry.....	34.0	14.0	1.3	1.0	47.0	1.4

The iron is carried direct to the basic Bessemer mill, which is equipped with three 15-ton converters grouped radially around one side of a circular pit commanded by a central casting crane backed by three primary and two secondary ingot cranes. The two spiegel cupolas are near the converters. A plant of three iron cupolas, to serve for emergencies, is located

at some distance in the vicinity of the three dolomite-calcining cupolas, so that the same blowers can serve them. The blowing-engine, of the Bayenthal type, is 2500 horse-power. The calcined lime for the basic operations is obtained from Ciney and Liège, the former carrying 0.8 per cent. of silica, 2 per cent. of alumina and protoxide of iron and 96 per cent. of lime, while the latter contains 1.5, 2.3 and 94 per cent. respectively. The Grevenmacher (Luxembourg) and La Mallieu (Belgium) dolomite contain, respectively, 1.1 and 0.5 per cent. of silica, 2.5 and 2.8 per cent. of alumina and protoxide of iron, 27 and 31.6 per cent. of lime and 20 and 21 per cent. of magnesia. Running full, the Longwy plant makes 22 to 24 blows in 24 hours, yielding a product of 250 to 300 tons of steel per day, or 6000 to 7000 tons monthly. This output is certainly very small considering the size of the plant, contrasting strongly with the make of some of the German basic plants, and representing only a portion of the product of American works running exclusively on soft steel. Even taking into account that Longwy casts a wide range of sizes of ingots, from 100 pounds to 12 tons, and that the steel produced varies from the hardest to the softest, this product is very small for the equipment. The Longwy Company have adopted a scale of grades for their products and publish the table below of tests and analyses to show the quality, the tests being made on forged rounds 100 mm. long and 16 mm. in diameter, the analyses being approximate averages.

The rolling-mill includes a 1.1-m. blooming-train and an 0.85-m. plate-

train, with a Breuer & Schumacher bloom-shear and a Delattre plate-shear. Both trains are driven by a 2000-horse reversing engine built by Miller & Co., of Glasgow. A 650-mm. (25-inch) reversing-train is used for rolling rails and shapes. It is driven by a 2500-horse Miller engine, which at the same time serves as motive power for a universal train, with 750-mm. (29-inch) horizontal rolls, the vertical rolls having a maximum displacement laterally of 900 mm. (35 inches). A three-high 600-mm. (23-inch) train is used for light rails, billets, flats, rounds, squares, angles, &c. It is driven by a 300 horse-power Bayenthal engine. The whole mill is commanded by a 30-ton crane. In an adjoining building is a rod-train driven by a 600 horse-power engine built by Gebrüder Klein, of Dahlbruch, Germany. The daily capacity of the works is about 300 tons blooms, 100 tons plates, 200 tons of rails, 120 tons of beams or channels, 160 to 180 tons of billets, 140 tons of small rails, 120 tons of merchant sizes, and 40 to 60 tons of small sizes in the rod-train. A machine-shop, boiler-shop, iron and brass foundry are adjuncts of the establishment, which possesses also a steel foundry with ten furnaces of four crucibles each.

The Longwy Works produce daily 60 to 70 tons of basic cinder, carrying from 15 to 16.5 per cent. of phosphoric acid, a typical analysis being the following:

Phosphoric acid.....	16.1
Silica.....	7.0
Oxide of iron.....	11.2
Oxide of manganese.....	6.4



Alumina.....	7.5
Lime.....	7.6
Magnesia.....	3.7
Total.....	99.6

The Longwy Works until lately allowed this cinder to slack, and after bolting it sold the fines as a manure, the drawback being that the absorption of water and carbonic acid caused the product to be lower in phosphoric acid from 8 to 10 per cent. They have lately put up a plant for grinding the cinder in the manner adopted in Germany and described in *The Iron Age* in connection with a sketch of the Rothe Erde Works.

The Société des Forges de Franche-Comté, at Besançon (Doubs), who are also licensees of the Robert process, make a wide range of products, including plates, sheets, very fine wire, barb-wire, wire nails, tacks, chains and special shapes. The concern are very large, employing about 4000 men. Their capital is 18,741,500 francs. The works seem widely scattered, at Fraisans, Raus, Champagnole, Bourgade-Sirod, Pont-du-Navoy and la Saisse in the Jura department, and Lods, Bui-

foundry. The products are bars, shapes, beams, rails, tires, sleepers of the Sévèrac type, springs, turn-tables, signals and chains. The rolling-mill is now turning out from 1200 to 1500 tons a month, but enlargements now progressing will carry it to 2000 tons a month.

The only charcoal pig-iron maker of France is A. Gourju, whose furnace is at Boignoud (Isère). Crucible steel is made at Bonpertuis (Isère) and special shapes for agricultural purposes are made at Rivier (Isère).

Thus far your correspondent may acknowledge he has not brought the readers of *The Iron Age* to the crack establishments of the exposition. We may confess that it is a temptation, being constantly in sight of the great trophies of the leading works, to wander away from the smaller displays described. Taken collectively, probably the most impressive collection of metallurgical products is that of

CHATILLON ET COMMENTRY, or, as their full title is, Compagnie Anonyme des Forges de Chatillon et Commentry, with head quarters at 19 Rue de La Roche-

To rolling-mill managers the most interesting part of the exhibit of the Chatillon et Commentry Company is the housing for the armor-plate train at Saint-Jacques, the idea being to avoid the necessity of a long wabblor. The accompanying sketch will explain the design. Two large gears are provided, A being the driven one, engaging with the roll pinion B. The upper roll D is driven through the intermediary of the gear C which is connected with D by rods E. The upper roll D is raised and lowered by means of the gear G and screw F. The maximum distance between its upper and lower position is 1 m. While the roll D is raised this distance the pinion C moves horizontally through the distance n, C moving in a horizontal guide. In this manner the inconvenience and dangers of a wabblor long enough to allow for a difference in position of over 3 feet in the upper roll are avoided. The total weight of the castings is 85 tons.

Among the other products of special interest are cast-steel annealing-pots. It is claimed that one of them stood 1000 operations at the Vierzon works of the company.

**Analyses of Manganese Ores.**—J. J. Traver, of Carter's Furnace, Carter County, Tenn., informs us that the rich iron ores of that county, to which he referred at the recent meeting of the Charcoal Iron Workers at Duluth, are in close proximity to large deposits of manganese ores. Analyses of some of these ores have been made as follows:

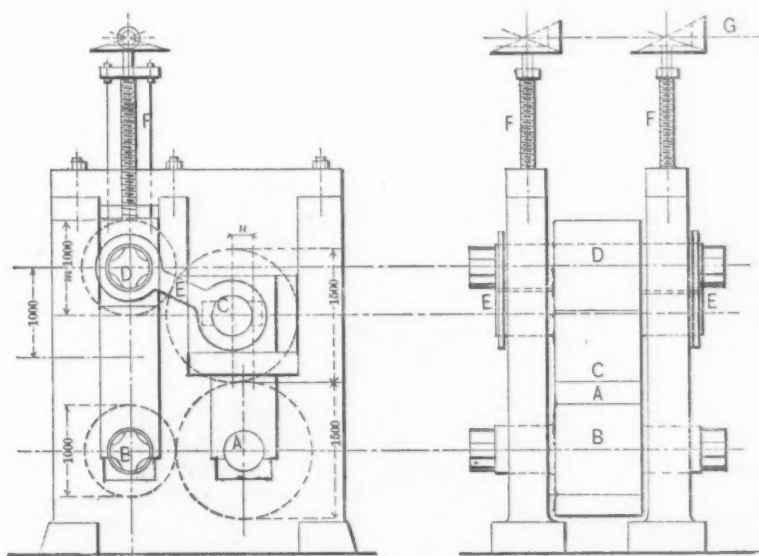
Manganese Ore from Blue Spring Vein.	
	Per cent.
Manganese.....	51.57
Iron.....	0.25
Silica.....	2.05
Phosphorus.....	0.253
Cobalt.....	0.916

Ore from the Taylor Bank.	
	Per cent.
Manganese.....	48.91
Iron.....	3.42
Silica.....	2.50
Phosphorus.....	0.216
Copper.....	trace.

Mr. Traver has had several analyses of other deposits, all of which run high in manganese, but not quite so high as the above. These beds of manganese ores, he states, can be traced for miles, but they have not been opened to any extent, as they have hitherto lacked transportation facilities, being 12 miles from a railroad. The Charleston, Cincinnati and Chicago Railroad, which is now being built, will intersect this region and make the ores available.

The finding of a large deposit of the rare and valuable metal uranium in Cornwall, England, has, by a remarkable coincidence, taken place in the centenary of the discovery of the metal. In that year of great events, 1789, Klaproth discovered the metal, and foreseeing how precious it would become, he coined for it a name out of the word Uranus, the planet then recently discovered by Herschell. At present selling prices the metal is worth £2400 per ton, or about a pound sterling for a pound of metal. It has hitherto been found only in patches in Saxony, Bohemia and Cornwall. The discovery of the large mass in a continuous lode is not, however, likely to bring down the value of the metal, because the demand for it is much greater than can be met. It produces two oxides, with one of which delicate golden and greenish tints are imparted to glass, while the other is used for black porcelain.

A German engineer, Daehr, proposes to corrugate the web of beams, and figures out a considerable reduction in their weight. He believes that this will more than counterbalance increased cost.



HOUSING FOR ARMOR-PLATE TRAIN, SHOWN IN EXHIBIT OF CHATILLON ET COMMENTRY COMPANY, AT PARIS.

ton, Chenecey, Quingey and Casamène in the Doubs department.

A very fine exhibit of axles and forged wheels for locomotives, cars, artillery trucks, carriages, &c., is made by the Forges de Gouzon, of the firm of Lucien Arbel; A. & P. Arbel, Fils & Cie., successors, of Rive-de-Gier (Loire). A rather poor looking lot of ingots is displayed by the Forges d'Hennebort, of Hennebort (Morbihan), the steel being produced on a magnesia hearth by the Muller process. The concern make sheets, tin-plates and decorated plates. Axles, shapes and bars are produced by the Société Anonyme des Forges et Fonderies et Laminoirs de Saint-Roch-lez-Amiens (Somme) and the Forges de Rimancourt. A. Pinat & Co., the Hauts-Fourneaux et Forges d'Allevard, of Allevard (Isère), make a specialty of springs, picks, hammers, spades and magnets, using open-hearth steel.

The Compagnie des Mines, Fonderies et Forges d'Alais, at Alais (Gard), have a capital of 9,000,000 francs, having been established in 1830. In 1875 the plant and property were leased to the Terrenoire Company for 21 years, but by mutual agreement the lease was canceled in 1884. The concern have iron mines at Alais, collieries at Trelys, a large coking plant, six blast-furnaces at Tamaris, a puddling-mill, open-hearth steel-works and rolling-mill, construction shops and chain-works and

foucauld, Paris. The company, who were established in 1845, have a capital of 12,500,000 francs, and are able to state that they have no funded indebtedness whatever. The company have collieries at Bézenet, Doyet, Les Ferrières (Allier) and at Saint-Eloi (Puy-de-Dôme), iron mines and quarries at different points, blast-furnaces at Montluçon-Saint-Jacques (Allier), Commentry, Beucaire (Gard) and Villefrance (Meurthe-et-Moselle), rolling-mills and steel-works at Montluçon-Saint-Jacques, rolling-mills, wire-works, nail-works, wire-rope manufactory at Sainte-Colombe, Ampilly, Mussy and Chamesson (Côte-d'Or), Plaines (Aube), Tronçais (Allier), Morat (Allier) and Vierzon (Cher). The range of their products comprises nearly every manufacture. Your correspondent noticed a series of samples of ferrochrome up to 39.48 per cent. chrome contents made at the Brancaire works, tungsten chrome and cement steels from the Saint Jacques works, angles, beams, tires, bars, wire, wire rope, wire nails, tin-plates, &c. As a specialty they manufacture two steel striated plates, one sample being shown 2.5 by 1.1 by 0.007 m. weighing 143 km. More striking to the visitor were, however, the fine lot of steel castings, including a large stern-frame for a French cruiser, screws, wheels and locomotive and car castings and a large casting for the top of a 10-ton hammer cylinder.

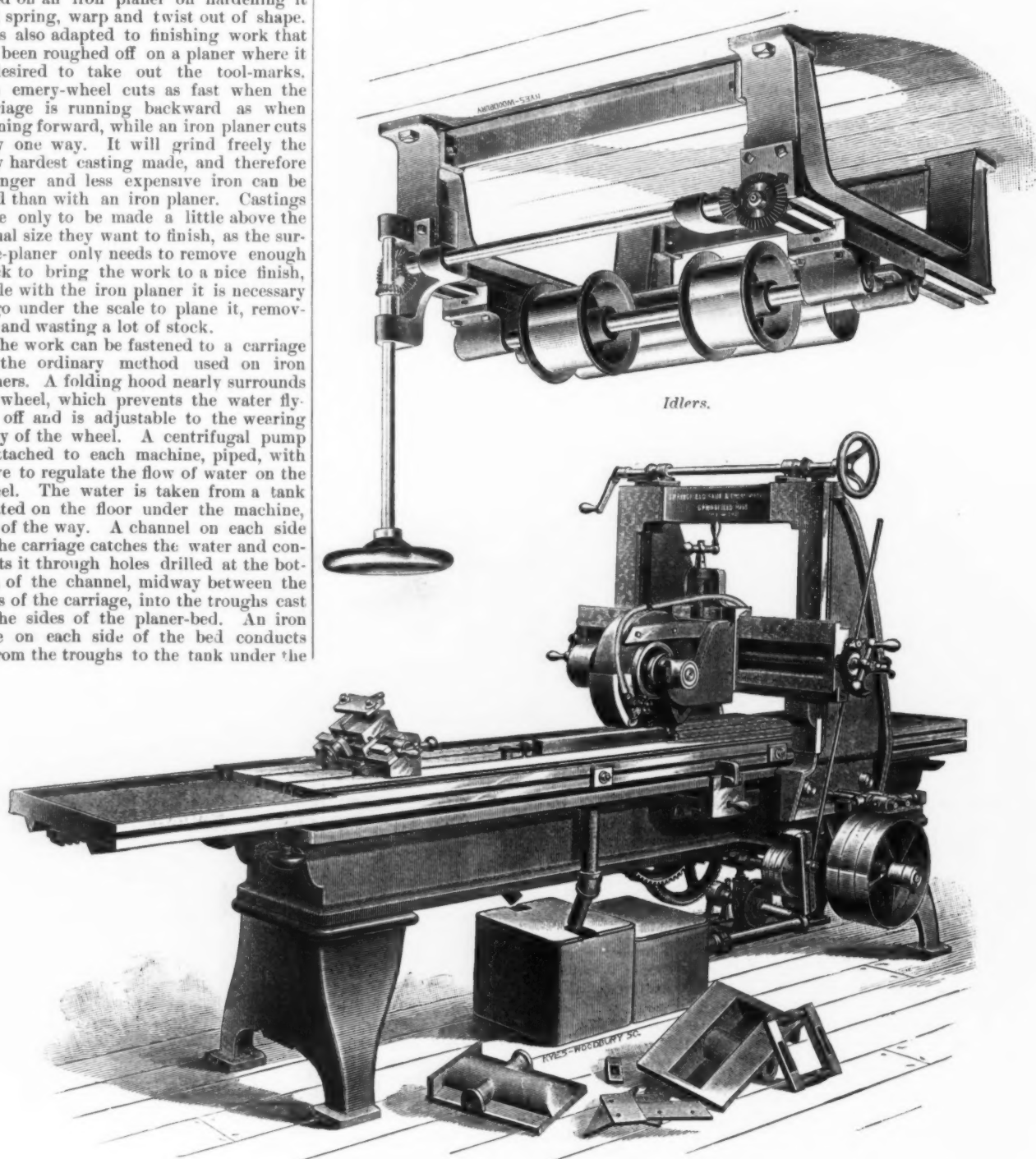
**Emery-Wheel Surface-Planer.**

This machine is especially adapted for surfacing iron in the rough where but a small amount is to be taken off and for finishing or cutting down work where the material is of a hard nature, as the surface of hard iron, chilled iron, steel, dies, punches, &c. On tempered work it saves drawing the temper and rehardening, and the work is true when done, while if finished on an iron planer on hardening it will spring, warp and twist out of shape. It is also adapted to finishing work that has been roughed off on a planer where it is desired to take out the tool-marks. The emery-wheel cuts as fast when the carriage is running backward as when running forward, while an iron planer cuts only one way. It will grind freely the very hardest casting made, and therefore stronger and less expensive iron can be used than with an iron planer. Castings have only to be made a little above the actual size they want to finish, as the surface-planer only needs to remove enough stock to bring the work to a nice finish, while with the iron planer it is necessary to go under the scale to plane it, removing and wasting a lot of stock.

The work can be fastened to a carriage by the ordinary method used on iron planers. A folding hood nearly surrounds the wheel, which prevents the water flying off and is adjustable to the wearing away of the wheel. A centrifugal pump is attached to each machine, piped, with valve to regulate the flow of water on the wheel. The water is taken from a tank located on the floor under the machine, out of the way. A channel on each side of the carriage catches the water and conducts it through holes drilled at the bottom of the channel, midway between the ends of the carriage, into the troughs cast to the sides of the planer-bed. An iron pipe on each side of the bed conducts it from the troughs to the tank under the

shown in the upper cut, to be fastened to the ceiling, for keeping the belt that drives the wheel at a proper tension. As the emery-wheel is raised or lowered for work of different thickness the idlers are run in and out by a system of bevel-gears and screws operated by a hand-wheel within easy reach. It is provided with a patent belt-shifter for the carriage motion, which is arranged to start one belt enough in ad-

tried, such as the suspension of zinc plates in the boilers, but without much practical effect, and nothing but the continual use of distilled waters seems to be of much effect. The condensers now used are so rapid in their action as to admit of this being done, but there has been no means of storing the surplus water until it is required. It is now, however, suggested that the great space wasted in double bot-



EMERY-WHEEL SURFACE-PLANER.—MADE BY SPRINGFIELD GLUE & EMERY WHEEL COMPANY.

machine, out of the way, where the sediment settles, and comparatively clean water overflows from the top of this tank into a second one, where the pump takes it, using the water over and over. The pump furnishes a large supply of water, which prevents heating and drawing the temper and gives a fine finish, and the grinding can be done much faster as a consequence. Moreover, it prevents loose emery flying on the working parts and on the neighboring machinery. The machine has an improved system of idlers,

vance of the other to prevent all screeching of belts when reversing motion of carriage. No. 3, the size shown, is made in six different lengths respectively, taking in work 4, 7, 9, 12, 15 and 18 feet long, by the Springfield Glue and Emery Wheel Company, of Springfield, Mass.

The British Naval Engineering Staff have been directing a good deal of attention to the best means of preventing the corrosion of the boilers of steamships from the use of salt water. Several devices have been

toms should be used for this purpose, and it is claimed that an increase in stability will result. As an experiment the Admiralty have ordered some ships now about to be commissioned to be fitted to carry the water in this manner, and if successful the principle will be generally carried out.

The Omaha *Bee* reports that the Glendale Tin Mining Company, of the Black Hills, Dak., commenced operations on Tuesday, October 1.



## Screw-Machine with Pilot Feed.

The engraving represents a screw-machine made by E. E. Garvin & Co., of New York. This size machine is made with and without wire feed, also pilot or lever feed, and is adapted for making screws  $\frac{1}{4}$  to  $\frac{1}{2}$  inch diameter. In a machine of this kind studs of two or more diameters can be cut off from the rod, the ends rounded, threaded and the head chamfered. Machine screws, washers, milled head-screws, &c., can all be turned out with the utmost rapidity and accuracy and perfectly finished. Any length of screw can be made, as the hole in the turret goes directly through it. The turret has six holes for the reception of tools. The indexing mechanism for the turret is of hardened steel and is strong and substantial. The locking-pin is hardened and ground and works in an adjustable taper bushing and fits into hardened taper index-sockets in the under side of the turret. The turret-slide has a screw top and the bearing-block is readily adjusted along the bed. The cross-slide has two

holes, the rivets were heated on the point only and driven into place, after which the ends were riveted over.

## The Nitrogen Contained in Ingot-Iron.\*

H. Tholander discusses the question, "Why is the ingot-iron produced in the open hearth of a better quality than that produced by the Bessemer process?" It may perhaps be suggested that the Bessemer metal is far less homogeneous in its character than is the open-hearth metal, but the great difference that may exist in the percentages of nitrogen dissolved in the respective metals is generally overlooked. In the Bessemer process nitrogen is blown through the molten iron, while in the open-hearth process the metal is protected from atmospheric action by a layer of slag. Chemical compounds of iron with nitrogen have long been known, but the affinity between the two elements does not appear to be very great. The author has made a series of comparative

raise the carbon to 0.10 per cent. the percentage of nitrogen remained unaltered.

A number of samples of open-hearth metal plate gave as a rule much lower results, as the following table shows:

	Carbon.	Silicon.	Nitrogen.
Open-hearth steel.			
Hammarby metal, ore process.	0.10	0.011	0.006
Hammarby metal, ore process.	0.10	0.008	0.005
Finspong metal, scrap process.	0.10	0.011	0.008
Finspong metal, scrap process.	0.10	0.012	0.008
Finspong metal, scrap process.	0.10	0.014	0.005
Finspong metal, scrap process.	0.10	0.014	0.006
Avesta metal, scrap process.	0.10	0.010	0.012
Avesta metal, scrap process.	0.10	0.010	0.012
Avesta metal, scrap process.	0.10	0.012	0.013
Avesta metal, scrap process.	0.10	0.019	0.008
Avesta metal, scrap process.	0.15	0.021	0.012

Samples taken at regular periods throughout the whole duration of an open-hearth charge showed the percentage of nitrogen to vary between 0.010 and 0.017, the percentage gradually diminishing and being at its lowest in the finished metal.

The pig-iron used at Avesta in the open-hearth process was found to contain about 0.010 per cent. of nitrogen, the percentage found by analysis having been as follows:

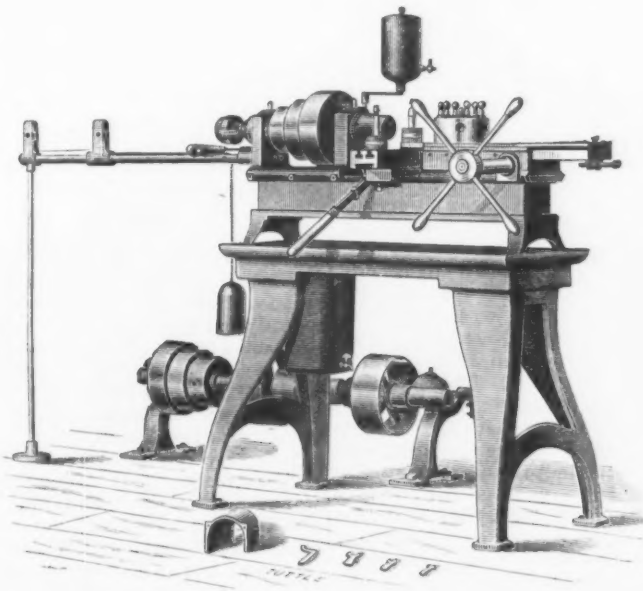
	Silicon. Per cent.	Nitrogen. Per cent.
Large-grained gray pig-iron.	0.41	0.010
Fine-grained gray pig-iron.	0.10	0.012
Mottled pig-iron.	1.41	0.011
White pig-iron.	1.10	0.005

Samples of crucible steel were found to contain from 0.006 to 0.008 per cent. of nitrogen.

Two 6-inch bars of soft Bessemer steel, each bar being 1 inch wide and  $\frac{1}{2}$  inch thick, were heated to a welding heat and then plunged into a bath of molten potassium cyanide. The bars having been brought to the temperature of the cyanide bath were then removed, and the one allowed to cool slowly in air, while the other was plunged into water. Both pieces were found to have become very hard, but the one which had been plunged into water was harder than the other. Samples were with difficulty removed from the surface layers of each specimen, and on analysis the unhardened metal was found to contain 0.294 per cent. of nitrogen and the metal which had been suddenly cooled 0.314 per cent. The next layer, lying immediately below the first or surface layer which had been removed, was found to contain 0.161 per cent. of nitrogen. The percentage of carbon in the slowly-cooled sample had increased from 0.10 to 0.15. Other samples of metal which had been similarly treated were also found to have absorbed large quantities of nitrogen, the hardness increasing with the percentage of nitrogen.

The author is of the opinion that the bad effects of an over-blow in the Bessemer converter on the quality of the metal produced is not due to oxidation but to the absorption of nitrogen. Finally, the author observes that if an extra soft open-hearth metal is required to be produced the following conditions must be observed: (1) Pig-iron as free as possible from nitrogen must be used—preferably charcoal iron made at a low temperature; (2) rich ore to be used in the decarburization; (3) water-gas to be used; and (4) the lining of the open-hearth to be of a neutral character.

The Thomson-Houston Electric Company have contracted to equip the street railways of St. Paul and Minneapolis with electric apparatus; also the Denver Tramway Company and a railway company in Milwaukee.



No. 2 SCREW-MACHINE WITH PILOT FEED.

tool-posts, which are each provided with elevating collars, which give a fine and parallel adjustment for tools. The slide is provided with a screw top. The spindle-bearings are bronze cap boxes, and all sliding surfaces are scraped to a bearing. The cone is  $8\frac{1}{2}$  inches diameter and has three speeds for  $2\frac{1}{2}$ -inch belt. There is a large reservoir in the bed of the machine, into which the oil drains and is drawn off at the bottom. The machine weighs 950 pounds.

Where rivets are long and the parts to be riveted are thick, says the *Railroad Gazette*, there is no use trying to use a hot rivet, because it will almost invariably become loose. As soon as such a rivet cools it is smaller than the hole and fits only under the head. If very long, then the head is liable to be fractured by undue shrinkage. The experience on the Forth Bridge is an example of that difficulty. It was found very undesirable to use hot rivets for that class of heavy bridge work. The rivets were in many cases nearly 5 inches in length and  $1\frac{1}{4}$  inches in diameter. The shrinkage was altogether too great. The plan adopted was to use cold rivets of accurate circular section, well and uniformly sized, to drive into the holes. Then, after the burr had been removed from the rivet-

determinations of the nitrogen contained in Bessemer and in open-hearth metal, the method he employed being that of Bous-singault, which depends on the nitrogen of iron nitride and of iron cyanide being converted into ammonium sulphate, when the iron in which the nitride is contained is dissolved in sulphuric acid. The ammonia is then driven out by an equivalent quantity of soda, collected and determined in the ordinary manner. The author, after describing the precautions he took to obtain sulphuric acid, soda and water free from nitrogen, gives the results of the analyses which he made. These results are as follows:

Bessemer Steel.	Carbon.	Silicon.	Nitrogen.
Avesta .....	0.05	0.009	0.015
Avesta .....	0.05	0.009	0.015
Avesta .....	0.10	0.013	0.020
Avesta .....	0.10	0.014	0.015
Avesta .....	0.10	0.014	0.016
Avesta .....	0.10	0.014	0.022
Avesta .....	0.15	0.020	0.012
Avesta .....	0.15	0.020	0.020

The metal of another charge which had been over-blown for three minutes contained before the addition of ferromanganese 0.05 carbon, 0.022 silicon and 0.032 per cent. of nitrogen, and after the addition of sufficient ferromanganese to

\* Jernkontoret's Annaler, Vol. XLIII, No. 7.

## Improved Corliss Steam-Engine.

*With Supplementary Sheet of Engravings.*

On the accompanying supplementary sheet of engravings we present the main features of the improved Corliss steam-engine manufactured by the Hewes & Phillips Iron Works, of Newark, N. J. This firm have been established 45 years, during which period they have devoted their energies almost exclusively to the manufacture of steam-engines, boilers and motive-power outfits. The range of sizes now made varies from 50 to 1000 horse-power in non-condensing and from 150 to 2000 horse-power in compound condensing engines. As the Corliss type of engine, now in use about 35 years, has become the recognized standard, their attention is devoted wholly to that class.

The Corliss valve-gear in this engine consists of four cylindrical valves operated in the usual way from a central swing or wrist plate by means of connecting-rods. Two valves are placed at each end of the cylinder, the uppermost ones admitting steam, while the lower ones exhaust it into a detached passage below the bottom of the cylinder. The valves admit the boiler-pressure to the cylinder at a fixed point in the commencement of the stroke and cut off the supply at some variable point, determined by the load or steam-pressure. The exhaust-valves have a positive connection with the wrist-plate, and are placed below the counter-bore and relieve the cylinder of all water of condensation, dispensing entirely with the use of drain-cocks. The engraving of the cylinder here presented shows one steam and one exhaust valve in position. It will be noticed particularly that the clearance spaces between the valves and the cylinder are short and as direct as it is possible to make them. The valves have long supports or bearings at each end. The direction of the flow of steam is shown by the curved arrows, which show that it enters the cylinders at the inner edge of the port toward the throttle-valve. This construction avoids the use of too abrupt angles in the steam current, the result being that the steam admission line is practically perfect. The opposite or left-hand end of the engraving shows a construction which is more or less common with other makers, in which the steam entering the cylinder is obliged to pass completely around the valve. In the valves we are describing no springs are used to hold them to their seats, as this is accomplished by taking advantage of the steam-pressure and the weight of the valve itself. The valves are self-adjusting, and are practically balanced.

The governor on this engine performs no work whatever, as it merely indicates the point of cut-off, and as the method of releasing the valve-gear is frictionless. The steam-valves are closed by a vacuum dash-pot of improved design, which is extremely rapid and quiet in its operation. It gives the steam-valves a very rapid movement in closing, the valves crossing the port-edges at a maximum velocity. The arrangement of the dash-pots in relation to the inlet-valves is shown in the drawing of the tandem compound valve-gear. The dash-pot is constructed with an iron base, supporting a hollow post in its center, which forms the piston of the vacuum-cylinder. Surrounding the cylinder and concentric with it is the air-cushioning cylinder, which arrests the motion of the steam-valve after steam has been cut off in the cylinder. When the steam-valve is opening the dash-pot rises and a strong vacuum is formed in the upper cylinder. The air above the cushioning-piston passes through the lateral openings in the top of the dash-pot down through the annular passages surrounding

the cushion-cylinder and enters the cushion-chamber below the piston. When the valve is released the reverse of this movement takes place. The vacuum draws the descending piston rapidly to its seat; the air below the cushioning-piston flows out gently through the passages and enters the spaces above the cushioning-piston. The same volume of air circulates constantly from one side of the piston to the other. No air passes out through any orifices to create unpleasant noise in the engine. The alignment of the dash-pot piston is accurately preserved by a key-way and feather conveniently placed for the purpose. The valves are driven from one end, the valve-stem being made with a rectangular end for the purpose. The use of springs in either the steam or exhaust valves is entirely dispensed with, the method here described of constructing them rendering that unnecessary. The cross-head, of which we present drawings, is secured to the piston-rod with a taper fit, and held by means of a cross-key which draws the rod firmly to the shoulder. Taper wedges at the top and bottom of the cross-head provide ample means for adjustment. When the cross-head has been given an accurate alignment and the adjusting screws have been firmly fastened the entire cross-head is as if made in one part. The sliding surfaces of the gibs are faced with babbitt metal, and are amply large for the severest duty.

The piston proper is a strongly ribbed casting, securely fastened to the piston-rod by shrinking. It is further secured by a key midway in its bearing in the piston, the end of the rod as a further precaution being riveted. To provide against the tendency of the piston to wear down or get out of center it is provided with a solid bull-ring, against which phosphor-bronze screws, with jam nuts, are provided for the adjustment. This permits of the perfect alignment of the piston with the cylinder. The bull ring is a solid casting, turned in such a manner as to have a full semicircular bearing on the lower half of the cylinder. At either end of the bull-ring are narrow piston-rings, which wipe over the counter-bore at each end of the cylinder, so that no shoulders can be worn to the surface. When the engine is first started the rings are set against the cylinder by their own elasticity. As they get weak from wear crimped springs are placed in the space underneath the rings, thus giving them the proper amount of tension to insure their accurate operation until they are worn out. The connecting-rod in this engine is made six cranks long, or three times the length of the stroke. It is provided with straps, with gib and key adjustment on both ends, a practice which has been almost universally accepted by engine-builders. The brasses are made of best copper and tin composition, and are lined with babbitt metal. In order to insure the even speed of the engine at all points of revolution the fly-wheels are of ample proportion, both in weight and diameter. Provision is made in these engines to enable them to run with much heavier loads than they were designed for by making all parts unusually heavy, this rule being adopted in order that the user of the engine may under all circumstances be thoroughly satisfied with its performance.

Our engravings also show in end and side elevation and plan the so-called cross compound. This consists in reality of two ordinary engines having cylinders bearing suitable relations to each other to adapt them to the compound principle, and which are placed side by side and provided with suitable steam passages which lead the live steam from the high-pressure cylinder across to the low-pressure, the frames being placed side by side, one each side of the fly-wheel. In this engine the cranks

are placed at 90° with each other, and although it occupies more space than the ordinary compound, the parts are more readily accessible for adjustment. When this type of engine is used a large receiver is placed between the cylinders and below the engine floor. The double-tandem compound consists of two tandem compound engines placed side by side and arranged as shown in the plan of the cross compound. Considering the power developed by the engines, this is more economical in space occupied than the other, since the compounding is provided for by the end-to-end arrangement of the cylinders. An idea of the form of the frame can be obtained from the perspective view. Hewes & Phillips build non-condensing, condensing, compound and triple and quadruple expansion engines. The boilers made are the horizontal, vertical, locomotive, flue, cylinder and the Manning patent vertical tubular.

**American Boiler Manufacturers' Association.**—The second meeting of this association will be held in Pittsburgh, Pa., Tuesday, October 15, 1889. This association has for its membership the leading manufacturers of steam-boilers of the United States, and the next meeting will be unprecedented in the history of the boiler business. All those in any way interested in the manufacture or sale of boilers of whatsoever kind or those desirous of gaining information on the subject are invited to be present.

**Profit in Motor-Work.**—The question: "What profit is derived from selling current for operating electric motors?" was recently put by the *Electrical World* to the superintendent of a well-known electric light and power station furnishing current to about 125 horse-power in small motors. His answer was 38 per cent. net profit on the original investment. Part of his daily expense account for operating the motors only is made up as follows: Coal, \$9; water, \$1.20; waste and oil, 10 cents; sundries, \$3; labor, two men, \$4. It is evident that the profit lies largely in the fact that the motors are numerous and small. The same quantity of current supplied to, say, large motors of 30 horse-power each would not yield any such return. But even then there would be a much better margin than is suspected by those who have not yet looked into motor problems or noted how remarkably the varying call for current practically doubles the capacity of the plant for motive-power purposes.

Advertisements have been issued from the Navy Department for proposals for steel for use in the construction of the two new cruisers of 3000 tons each, known as Nos. 7 and 8, which the Government will build at the New York and Norfolk navy yards. Bids will be opened on October 31, the delivery of steel to commence within 30 days from the date of signing of the contract, and to be completed in six months. The steel called for is all that will be necessary in the construction of the two hulls, and is divided into six classes, on which bidders may make separate proposals. The material advertised aggregates 1131 tons of steel. The largest items are 862 tons of steel plates, 106 tons of steel shapes, 83 tons of steel castings and 70 tons of rivets.

It is announced that the Pencoyd Iron Works, of Pencoyd, Pa., are the last addition to the concerns which English capitalists have expressed their eagerness to purchase.



## THE WEEK.

The Pennsylvania Warehousing and Safe Deposit Company have purchased the property at the northeast corner of Swanson and Catharine streets, Philadelphia, of P. Fitzpatrick for \$110,000, subject to a mortgage of \$50,000. The lot extends 115 feet along Swanson street and along Catharine street to the Delaware River. This company have also purchased from the same owner for \$90,000, subject to a mortgage of \$70,000, the properties at the southeast corner of Swanson and Catharine streets, measuring 106 x 214 feet, and at the southeast corner of Delaware avenue and Catharine street, measuring 108 x 311 feet.

It is stated by good authority that the cost of the Eiffel Tower will be covered before the exposition closes.

A contract between the city of Newark, the East Jersey Water Company and the Lehigh Valley Railroad Company for a supply of water, involving an outlay of \$6,000,000, has been duly signed. It is proposed to take the water from the Pequannock River, a few miles below a large storage reservoir which is to be erected at Oak Ridge. Below Pompton the iron conduit will be laid along the Lehigh Company's property to Newark.

The Mayor of New York has been asked to order an investigation of the sacrifice of human life caused by high electric currents. It is stated that since May 6, 1887, 17 persons have been killed in the city of New York through that cause.

The Coal Exchange of Philadelphia, at a meeting recently held, adopted 2240 pounds as the standard weight of a ton of coal.

Philadelphia was agitated during last week over reports that at least one of its well-known financial institutions had gone too largely into "wild-cat" mortgages on lands in Western Kansas and Nebraska.

Official figures concerning the crops in Minnesota indicate that there has been a large increase in all the leading cereals. The yield of wheat is put at nearly 45,500,000 bushels, that of oats at 48,250,000, that of corn at a little over 22,000,000 and that of barley at a little over 9,000,000 bushels, the flax crop being placed at 1,650,000 bushels.

A majority of the naval commission appointed some months ago to select a site for the proposed naval yard on the South Atlantic or Gulf Coast has decided that the best available is on the Mississippi River just opposite New Orleans.

Pittsburgh papers figure out that the Board of Assessors have fallen short by nearly \$44,000 in their calculations for the current year.

The Philadelphia Company have taken on 2000 additional houses this season in Pittsburgh to supply them with gas, and it is stated that the iron-works are consuming twice the usual quantity of natural gas.

Ishpeming, Mich., is to have an electric railroad which will connect it with Negaunee, three miles distant. The total length of the road for the present will be six miles.

An important point has been gained by the Third Avenue surface road in their efforts to employ the cable as the motive power of their line. The company desire to operate the road at two speeds—six miles an hour below and eight miles an hour above Third street, but meeting with opposition on the part of the State Railroad Commissioners, they have changed the speed to four miles an hour in the

lower part of the city, to six miles in the intermediate section, and to eight miles at the upper end of the road. The Commissioners have imposed as a condition, which has been accepted, that the present form of T-rail be abolished.

The Philadelphia Record draws a sad picture of the decline in the grain export trade of Philadelphia. From a maximum of nearly 31,000,000 bushels in 1879, the trade has declined in 1888 to less than 2,000,000 bushels, the percentage falling from 16 per cent. in the former year to 3 per cent. in the latter, while New York increased from 45 to 51 per cent. and Baltimore fell off only slightly over 20 to 15 per cent.

Señor Zelaya, the delegate of the Republic of Honduras to the Conference of the Three Americas, remarks that trade from Honduras is largely with Europe because the facilities of transportation are greater, credits are longer and the Europeans sell a cheaper class of goods at low prices. The trade with Europe, however, is diminishing compared with what it was several years ago, and at present American goods are being extensively introduced. The American goods are much better than those of Europe, and are looked for by shrewd buyers, even though the prices to be paid are higher; but the mass of the people prefer cheaper goods, even though they are not so lasting. In the line of mining-machinery, sewing-machines and many other manufactures of metal American goods are used almost exclusively. In the line of dry goods the European products prevail. Many people in Honduras make their purchases at Belize, where English goods are exclusively sold. The steamship lines make communication between Honduras and Europe much easier than it is between Honduras and North America. The exports of fruits to New Orleans have a value of \$1,000,000 per annum.

One of the largest blasts ever made in the Lehigh Valley was fired last week at Glendon Iron Company's quarry, about two miles from Easton. Several tunnels large enough for a man to crawl in and deposit powder were made, work on which occupied several months. Two carloads of dynamite powder were used and touched off by electricity by a professor of Lafayette College. A low, rumbling noise followed, and down came thousands of tons of rock, without causing an accident or damaging the many buildings in the adjoining country section.

A cast-steel gun weighing 235 tons has just been shipped by Messrs. Krupp from Hamburg for Cronstadt. The caliber of the gun is 12½ inches; the barrel is 40 feet in length. The range of the gun is over 11 miles and it will fire two shots per minute, each shot costing between \$1250 and \$1500. At the trial of the gun, held in the presence of Russian officers at Mepen, the range of the Essen firm, the projectile, 4 feet long and weighing 1800 pounds, propelled by a charge of 700 pounds of powder, penetrated 19½ inches of armor and went 1312 yards beyond the target. The gun is the largest in existence.

The anti-pool and trust law of Missouri went into effect May 18, 1889, and will be vigorously enforced. Copies have been sent to the 7500 corporations doing business in that State. All will be required to state under oath that they have not created or entered into any pool, trust, agreement, combination, confederation or understanding with any other corporation, partnership, individual or any other person or association of persons to regulate or fix the price of any article of merchandise or commodity, and that they have not entered into or become a member of or a party to any pool, trust, agree-

ment, contract, combination or confederation to fix or limit the amount or quantity of any article, commodity or merchandise to be manufactured, mined, produced or sold in that State, and that they have not issued and do not own any trust certificates and are not now engaged in any combination, contract or agreement the purpose and effect of which would be to place the management or control of such combination or the manufactured product thereof in the hands of any trustee with the intent to limit or fix the price or lessen the production and sale of any article of commerce, or to prevent, restrict or diminish the manufacture or output of any such article.

The San Francisco authorities regard with favor the scheme of Engineer Von Schmidt, who can guarantee the delivery of 30,000,000 gallons of water daily from Lake Tahoe, 250 miles distant. He wants \$15,000,000 for steel pipes.

Florida rejoices in her escape from yellow fever this season. No genuine case has been found anywhere in the State during 1889, but Florida is still menaced with danger. The source is through the smugglers who ply between Cuba and Florida. Last month ex-Mayor Cobb, of Pensacola, wrote to Surg.-Gen. Hamilton on this head. He asserts that there is practically no protection against smugglers, the Government having only one "tub," as he calls it, to protect the long coast of Florida. He says there are a thousand smugglers plying between Cuba and our shores, and that they could be caught daily if there were sufficient coastguards and armed vessels.

Disaffected Knights charge Powderly with failing to account for \$800,000.

Chicago ventures to compare herself with New York. The census of 1880 showed somewhat larger population within 500 miles of Chicago than within the same distance of New York, the figures being about 21,000,000 in the one case and about 20,000,000 in the other. This difference in favor of the Western city is largely due to the fact that a large part of the space within 500 miles of New York is covered by water.

The English Post-office does all the express business of Great Britain, carries the parcels at an average of 11 cents each, and makes a profit of \$2,250,000 a year.

A Boston merchant in the trade states positively that a rubber trust, capital \$30,000,000, will soon be organized.

Minister Ryan in his report from Mexico transmits some statistics concerning the value of American machinery imported annually from the United States. These figures show that the value of importations of American machinery into Mexico have steadily increased since 1881. In 1883 the importations nearly doubled, reaching \$943,305. A similar increase was noted in 1884, the value being \$1,685,887. In 1885 there was another remarkable increase, and the Mexicans bought American machinery to the value of \$2,230,780. There was not so great an increase the next year, 1886, for the importations were valued at only \$2,869,400. In 1887 they reached \$4,000,000. There are no figures given for 1888. It is calculated, however, that 1888 as well as 1889 will show a marked increase, and that for the latter year the value of the importations will probably exceed \$6,000,000.

According to the latest official statement, the contributions for the relief of the Johnstown sufferers aggregate \$3,500,000.

The fruit-growing industry of the Pacific Coast has been developed to a point that has brought it in keen competition in the foreign fruit trade which lately enjoyed

a monopoly of the territory east of the Rocky Mountains. California prunes and raisins have commenced to crowd the market, despite high railroad freights, as against cheap ocean transportation.

The shipments of iron ore from the Lake Superior mines this year are already over 5,000,000 tons, and will probably amount to 7,000,000 tons by the time lake navigation shall close.

Thomas A. Edison has been spending some days at Sir John Pender's country residence in Kent, England. Many scientific men were invited to meet him.

According to the latest estimates, Missouri ranks second in the list of corn-producing States this year. Iowa stands first, Kansas third and Illinois fourth. The aggregate yield of these four States is put at 1,141,000,000 bushels, or over one-half of the total corn product of the country.

The Oregon Steam Navigation Company have bought the handsome Hudson River steamer City of Kingston for \$130,000.

Fire from a coke-oven broke out in McCleary & Oberle's foundry, at Omaha, 26th ult., and patterns and machinery valued at \$15,000 were burnt.

The manufacturing industries of Lawrence, Mass., for the year 1889 are valued at \$13,000,000. The worsted and woolen spindles in operation number 115,522; cotton, 415,448; looms, 12,445. Nearly \$5,000,000 are paid out annually to 12,720 operatives, who turn out a total annual cloth product of 160,000,000 yards.

The Board of Navy Yard Commandants decide that the system of navy purchasing now in vogue is efficient.

Four new States will have been added to the American Union before the close of the present month. October 1 North and South Dakota, Montana and Washington adopted the respective constitutions, elected State officers and will send eight new United States Senators to Washington. The President's proclamation will complete the formal admission of these four children into the family of Uncle Sam, which will then have a total membership of 42.

Chicago has landed her first consignment of cattle by direct shipment to Europe, and 5000 head will follow immediately.

The Secretary of Agriculture, after an inspection of the sorghum-cane mills in the West, is unable to pronounce the diffusion process a success.

S. Sadachia, architect, of Tokio, Japan, is on an official visit to this country, familiarizing himself with the Government's methods of doing business in the construction of public buildings.

Direct telegraphic connection with the new iron center at Birmingham, Ala., has been completed.

Holtzclaw Brothers, of Washington, the lowest bidders, have been awarded the contract for building the iron and steel shop at the Norfolk Navy Yard at a cost of \$71,568.

Still another important religious edifice in China has been destroyed by incendiaries, who hoped the fire would be ascribed to supernatural origin and be construed as evidence of the displeasure of the gods on account of foreign innovations, particularly in railroad-building. The imposture was detected, and officials high in authority have decided that the railroad must be completed to Peking. Railroads in China, as in Russia, are found to be indispensable for the conveyance of troops and otherwise essential to the security of the empire.

## MANUFACTURING.

### Iron and Steel.

Hubbard Furnace No. 2, of Andrews & Hitchcock, at Hubbard, Ohio, which has been idle for some time, was put in blast on Wednesday, the 25th ult. It is the intention of the firm to operate both stacks for the present.

Furnace F, of Carnegie Bros. & Co., Limited, at Braddock, Pa., which has been idle for some time undergoing repairs, resumed operations last week. All the stacks of this firm, including the two Lucys, at Pittsburgh, are now in successful blast.

The Findlay Iron and Steel Company and the Briggs Edge Tool and Rolling Mill Works, of Findlay, Ohio, have merged into the Findlay Rolling Mill Company, incorporated with a capital stock of \$100,000, and the two establishments, under the superintendence of Mr. Briggs, are running full force, with abundance of work on hand.

North Penn Furnace, at Bingen, Pa., owned by the Bethlehem Iron Company, of Bethlehem, Pa., which has been idle for some time, is now undergoing repairs and will be put in blast at an early date.

Under date of the 27th ult. Carnegie, Phipps & Co., Limited, of Pittsburgh, made the following announcement to the trade: "Mr. William P. Palmer has resigned the office of secretary to accept the position of general sales agent. Mr. Otis H. Childs, formerly secretary of the Apollo Iron and Steel Company, of this city, has been made secretary of this association."

The Carpenter Steel Company, of 115 Broadway, have completed their works at Reading, Pa., with J. H. Carpenter as general manager. They manufacture hammered and rolled crucible steels for tools, cutlery, dies, chisels, spindles, files, springs, &c.

No. 2 furnace, of the Troy Steel and Iron Company, was banked during a part of September owing to a shortage of coke. Nos. 1 and 3 are being relined, No. 3 being nearly completed.

The Carp River Furnace, at Marquette, Mich., which was partly destroyed by fire some years since, is being reconstructed with a view to resuming the manufacture of charcoal pig-iron. It will be operated by the Carp River Furnace Company, in which Burt Brothers, of Detroit, have a large interest. Hiram A. Burt is at present secretary and treasurer and Solon Burt general manager, but in view of other interests requiring their attention the management will probably devolve on Charles S. Burt. The old stack is in good condition, not even requiring relining, but new buildings and a new equipment had to be supplied. It will be ready for blast about December 1.

The Wisconsin Malleable Iron Company are making extensive additions to their plant at Milwaukee, Wis. A new foundry is being erected which will be 67 feet wide by 297 feet long. The capacity of the works will be almost doubled by these enlargements.

The Illinois Steel Company are greatly improving their Joliet plant. The new blast-furnace is being pushed rapidly with a view to getting it in operation early in the spring. The Athenæum Building, also being erected by the company, will soon be ready for occupancy as a free library, reading-room, billiard and club rooms, bowling-alleys, &c., for the Illinois Steel Company's workmen. The building is of Joliet stone, three stories and basement, and one of the finest in the city, and is

situated on North Carolina street. The new offices further north are equally imposing and with improved conveniences suitable for the staff of management and their assistants. It is currently reported that plans are now being prepared for extensive additions to the company's South Chicago plant. A plate-mill of the most modern type is one of the projected improvements. It will be equipped with open-hearth furnaces. The blast-furnaces are also to be increased in number, perhaps doubled.

One of the stacks of the Coplay Iron Company, Limited, at Coplay, Pa., was blown out last week for the purpose of being relined and repaired. It will resume operations again as soon as repairs are completed.

The Crescent Steel Company, of Pittsburgh, with a capital stock of \$1,000,000, were chartered last week. The directors are Reuben Miller, William Metcalf and Charles Parkin. The firm were formerly known as Miller, Metcalf & Parkin, or the Crescent Steel Company, Limited. The limited partnership has been dissolved and the company incorporated. No extensive improvements to the plant are contemplated.

The steel plant of the Bellaire Nail Works, at Bellaire, Ohio, are idle, on account of a strike of the workmen. The employees are all members of the Amalgamated Association with the exception of three men who refused to join the organization. The balance of the employees notified the firm that unless these men were discharged they would quit work. The firm refused. The firm have since paid off the men and discharged them, and from present appearances it will be some time before the trouble is settled. The blast-furnace continues in operation.

The Reliance Steel Casting Company, organized at Pittsburgh some months ago, have just completed the erection of works at the corner of Thirty-sixth and Railroad streets, in that city, and successfully made their first cast last week. They are now operating their plant full turn and have a large number of orders on hand. They make a specialty of light and medium weight steel castings.

The Carbon Iron Company, of Pittsburgh, will soon commence the erection of two additional open-hearth furnaces, which will double their capacity. They have recently turned out some heavy work in the shape of eye-bars for the Merchants' Bridge at St. Louis. These bars measure in size 8½ inches high by 2½ inches wide, and are 62 feet 8 inches long and weigh over 2 tons each. They are believed to be the largest eye-bars ever put in a bridge.

There is some talk of building a second Pulaski furnace at Roanoke, Va.

The Wilmot & Hobbs Mfg. Company, of Bridgeport, Conn., manufacturers of cold-rolled strip-steel, are very busy at present, and to enable them to keep pace with their continually increasing business they will either have to put up more new buildings and machinery or contract for the hot-rolling of 1000 or 2000 tons per year of various widths and gauges of long steel bands in coils.

### Machinery.

The works of the Westinghouse Electric Mfg. Company, at Pittsburgh, were considerably damaged by fire the night of the 27th ult. The fire will not interfere in any way with the operations of the plant.

Broderick & Bascom Rope Company, St. Louis, Mo., have just closed a contract with the People's Railway Company, of that city, to supply them with 5000 feet of steel cable. There were a number of well-



known manufacturers bidding for this contract, but the Broderick & Bascom Company's cables, a number of which are in use in St. Louis, have given such general satisfaction that the contract was awarded them.

The Aetna Machine Company, Warren, Ohio, have received an order from the Terre Haute Iron and Nail Company, of Terre Haute, Ind., for a 300 horse-power engine, to drive a train of rolls in their rolling-mill at that place.

The Abendroth & Root Mfg. Company have received an order for eight sectional safety boilers to be shipped to Yokohama, Japan. The rapidly-growing business of the company has made necessary the erection of an additional factory 200 feet long by 175 feet wide.

At the Oliver Oil Company's mill, at Charlotte, N. C., there is a 65 horse-power Westinghouse engine which has been operated night and day (starting 12 o'clock Sunday night and stopping 12 o'clock Saturday night) for five years, and during that time it has not cost \$5 for repairs, and the mill has never stopped a minute on account of the engine.

#### Hardware.

Lovell, Tracy & Co., Hartford, Conn., manufacturers of axle-grease, whose factory was destroyed by fire some time ago, have completed new buildings and are now in a position to fill orders promptly. The new plant is larger and better equipped than the old factory, a portion of it being specially fitted up for the manufacture of their specialty, Axleline.

United States Wire Nail Works, recently of Indianapolis, Ind., are now located at Jackson, Ohio. We are advised by the company that in the space of five years all the available room for extending the works in their first location at Indianapolis was occupied, and the need for still greater facilities made it imperative that a new location be procured. After a careful scrutiny of the field it was found that Jackson, Ohio, was the best adapted to their purposes on account of its shipping facilities, the quality of its furnace coal, the abundance of iron ore and the enterprise of the city, which gave substantial inducements to the company to locate there. The difficult task of the removal of the plant from Indianapolis has been accomplished, and the works are now located in commodious, substantial new brick factory buildings with iron roof and with abundance of ground. As a consequence of this removal the facilities have been much improved and the capacity of the works largely increased. Active operations will be resumed in a few days. We are also advised that it is in contemplation by the United States Wire Nail Works to erect their own furnaces and rod-mills in the near future, their purpose being to build up a large enterprise in their new location.

The works of the Enterprise Hardware Company, Limited, in Allegheny City, Pa., were almost totally destroyed by fire on the 21st ult., causing a loss of \$10,000, fully covered by insurance. The company were large manufacturers of novelties, such as door locks and keys, sash-weights and light castings, and had a large number of orders on hand. The works will be rebuilt at once.

The Standard Fiber Ware Company, of Mankato, Minn., are bringing out a new white decorated slop-jar and chamber-pail, which, with white mats and wash-basins they are also about to put on the market, will make most attractive goods for this line of trade. The company are improving their manufacturing plant by putting down at a cost of \$1200 a 6-inch artesian well 600 feet deep. This well has a pressure of

30 pounds, and avoids the expense attending the pumping of large quantities of water from the river, for use in the process of manufacturing. Referring to these goods, the *Western Stockman and Cultivator*, of Omaha, recently indulged in the following:

They are light, strong, handsome and cleanly. The wash-basins do not rust out or slip from the fingers and break. The water-pails, in the language of hundreds who have used them, are the "only pails fit to hold drinking-water." The dairy-pail is the only thing made that won't taint milk, get sour or need scouring. The slop-jars never lose their paint or decorations, like tin, or break, like crockery. The spittoons are the most serviceable and easiest to clean of anything in use. The mats will in one year save more carpets than they cost, and so on through the list.

Ludlow-Saylor Wire Company, St. Louis, Mo., report an active demand for barbed and plain wire and wire nails. Their trade in steel wire bale-ties is unusually heavy, but as they have a good stock on hand they are enabled to ship promptly.

The St. Joseph Pump Company, St. Joseph, Mo., manufacturers of the celebrated Perfection pump, had on exhibition at the New Era Exposition, held in St. Joseph, a fine display of their goods, including three complete machines, all in operation, which were destroyed in the conflagration that visited the exposition on the night of the 15th ult. Their secretary, E. A. King, informs us they have at once begun the reconstruction of all the machines lost, and, fortunately, have a stock on hand of sufficient dimensions to supply the demand until they regain their usual capacity, which will be in about 30 days.

W. G. Avery, Cleveland, Ohio, has received notice from the Commissioner of Patents that his applications for improvement in stock-cars and for improved cattle-trough have been allowed.

Hawkins Nail Puller Company, Terre Haute, Ind., are putting in new machines for the manufacture of their nail-puller, the demand for which has been in excess of their manufacturing facilities.

#### Miscellaneous.

The coke-workers in the employ of the Cambria Iron Company, of Johnstown, Pa., who have been out on a strike for some time, have agreed to return to work under the following agreement, which has been signed by the firm and also by the workmen: "We agree to pay the same rate of wages paid by the H. C. Frick Coke Company, and will make no changes until there is a change made by them. Any wages mentioned on our list that do not agree with the wages paid by the Frick Coke Company will be corrected when proven, and any branches of work not mentioned on our list will be paid for at the same rate paid by them. We do further agree to make no discrimination on account of strike. All back house-rent due is canceled up to September 1, 1889. The mines will not be crowded with men."

Shultz Belting Company, St. Louis, Mo., have a very attractive exhibit at the exposition now being held at St. Louis. The display consists of a large assortment of different sizes of belting, from 1 inch up to 48-inches. The latter is intended for the Metropolitan Electric Light Company, who have the contract for lighting the city. This belt is one of the largest made and is subject to much favorable comment.

The National Pulley Covering Company, of Baltimore, announce the establishment of their New York office at 58 New street, to which place all inquiries and correspondence from the New England States, New York and New Jersey should be addressed. Among their recent customers may be mentioned Storrs Distilling

Company, Cincinnati; Akron Electric Company, Akron, Ohio; S. L. Webster & Son, Cambridge, Md.; Hiram Walker & Sons, Walkerville, Canada; Jackson Iron Works, New York; Hammond, Hull & Co., Savannah, Ga.; H. P. Deuscher Company, Philadelphia; Chas. Banister, Waco, Texas; Wampanoag Mills, Fall River, Mass.

The Parry Mfg. Company, established in 1883 at Rushville, Ind., and subsequently located at Indianapolis, have now reached a capacity of 500 road carts per day. The president, David M. Parry, stated that it is expected that soon the number will be increased to 800, and that before next spring the average will be carried up to 1000 carts a day. The largest contract ever received was for 15,000 road-carts. The company are putting in an electric plant, by which all the welding is to be done. The wheels are furnished by the Woodburn-Sarven Company, of Indianapolis. Among the special machinery in use by the company is a tire-shrinker, with which two men are able to tie up 1200 wheels in a day. The hubs are bored out by a special machine invented by D. M. Parry, the president.

John R. White, W. B. Reed, L. S. Allison and Joseph McKnight, of Philadelphia, joined a number of Lebanon capitalists, including Robert H. Coleman, and visited Colebrook Station, along the line of the Cornwall and Lebanon Railroad, about one mile from Mount Gretna, with a view of locating works there for the manufacture of the Fottrell insulated wire. The company have a capital of \$1,000,000. They will manufacture electric light, telegraph and telephone wires and insulated tapes under the Fottrell process.

#### An Important Southern Project.

The following press dispatch has been sent out from Chattanooga, Tenn., under date of September 29:

A number of owners of charcoal iron furnaces in Middle Tennessee, with a syndicate of New York capitalists, to-day organized under a charter in the State of Alabama, at Huntsville, the Southern Iron Company, and closed the purchase of three charcoal furnaces in Middle Tennessee, one charcoal furnace at Atalla, Ala., and the Roane Iron Company's steel rail mill in this city. The company organized with a capital stock of \$2,700,000 paid up. The purpose of the company is the immediate remodeling of the mill here to make steel by the basic process, using the Siemens-Martin furnaces. The product of all the furnaces will be brought to this city to be manufactured into steel rails, nail-plate, steel wire and plates of all kinds. Improvements on the mill here will cost between \$150,000 and \$200,000 and will be begun at once. Five hundred men will be employed at the start. The company also purchased the celebrated ore mines of the Roane Company at Cranberry, and will use metal made from this ore in steel-making here. The company organized yesterday at Huntsville with the following directors: J. M. Fogg, Nat Baxter, Jr., John P. Williams, Isaac T. Rhea, Percy Warner, James C. Warner, T. W. Wrenne, of Nashville; John H. Inman, C. H. McGee, of New York; Thomas Sedden, T. Hillman, of Birmingham, and H. F. Chamberlain, of Chattanooga; Nat Baxter, Jr., of Nashville, was elected president and W. McNeely secretary and treasurer. This deal is regarded as one of the most important made for many years.

The Queen and Crescent route have issued a new rate-sheet on pig-iron. Rates are now on the basis of \$2.75 from the Birmingham district to Cincinnati.

# The Iron Age

New York, Thursday, October 3, 1889.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.  
CHAS. KIRCHHOFF, JR., - EDITOR.  
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.  
RICHARD R. WILLIAMS - - - HARDWARE EDITOR.  
JOHN S. KING, - - - BUSINESS MANAGER.

## The Government as a Ship-Builder.

It is somewhat unfortunate that obedience to the law has forced the Secretary of the Navy to undertake the work of the building of the two 3000-ton cruisers at the Government yards. We believe that the public at large does not view favorably the system of Government ship-building, nor does conversation with naval officers show that they differ from the majority in their opinion concerning its expediency. It has been generally recognized that it is wise to encourage private ship-building, because then in an emergency the Government has at its disposal important resources. Even now, with what little we have done, there has been an increase in the number of establishments capable of undertaking and carrying through with brilliant success the work of building large and fast war-vessels. There has been an accession to their number lately, and it is quite generally known that at least one of our greatest steel companies is developing plans which will put it foremost among the ship-builders of the country. We have observed what a beneficial effect upon the steel industry, from the stand-point of the general consumer of plates, for instance, the orders of the navy have had. It is not too much to expect very favorable results for the ocean carrying trade of the United States, also. For that reason it is to be deplored that the work has been withdrawn from private firms. Past experience with Government undertakings does not give much encouragement on the score of economy. The incentive to close and vigilant conduct of manufacturing is missing. However conscientious those in the service may be, they do not possess the power and cannot exercise the discretion of private builders. When finally the estimates have been exceeded, additional appropriations must ultimately be granted.

On the other hand, it is claimed with some show of justice that the Government must have the plant and equipment to make needed repairs and that a relatively small additional outlay puts it into the position of being able to become a builder. It is urged that there is additional safety in possessing a still greater number of ship-building plants and that in some contingencies they may act as a check on any efforts to extort unduly large profits on the part of private ship-builders. We are not inclined to attach much importance to this contention, the danger being too small now and likely to dwindle still more in the future. However, the good work of building a navy has only begun, and it is to be hoped that every year for a considerable period to come further sums will be authorized by Congress, so that both private and Government yards will be kept busy.

## The Pan-Americas Congress at Washington.

The conference of American nations convoked under the provisions of the law of May 24, 1888, to meet in Washington on the 1st inst. will have before it the following subjects for discussion:

1. The preservation and promotion of "prosperity."
2. "An American customs union" to promote "the trade of the American nations."
3. Regular and frequent communication between one another.
4. A uniform system of customs regulations for each, embracing importation, exportation, port dues, classification and valuation of imports, invoices and quarantine.
5. Uniform weights and measures, patents, copyrights, trade-marks and extradition.
6. A common silver coin to be a universal legal tender in the American States.
7. Arbitration and prevention of wars.
8. Anything relating to the welfare of the American States that any State may present to the conference.

The countries represented besides our own are Brazil, the Argentine Republic, Uruguay, Chili, Colombia, the five Central American republics, Mexico, Bolivia, Venezuela, Peru and Ecuador. No answers to the invitation have been received from Santo Domingo, Paraguay and Hayti. The British, French, Spanish and Dutch colonies of America were not invited. In order to duly appreciate the commercial and financial importance of the West Indies, Mexico, Central and South America, it should be mentioned that with a population of 50,000,000 their aggregate trade amounted last year to \$1,200,000,000, American gold, our share of which was \$240,000,000. We bought of them \$181,000,000 and sold them \$69,000,000, leaving a balance against us of \$112,000,000, which we paid in gold to European bankers. During the past 20 years our purchases increased \$78,000,000; our sales only \$12,000,000, increasing the balance against us \$66,000,000. The aggregate Spanish-American and Brazilian securities held in Europe at present amount to \$782,000,000, railroad bonds and shares \$456,000,000, and of banking and miscellaneous companies a joint capital of \$174,000,000, constituting an investment of European capital of \$142,000,000. The interest and dividends paid on the \$174,000,000 of stock of public companies averaged of late years about 12 per cent. There has never been any default on the \$456,000,000 of railroad bonds, the majority paying dividends on their stock. All the countries south of us are at present at peace and prospering in consequence of the remunerative prices they obtain for all they produce with the sole exception of copper and hides. Some of them attract immigration on a vast scale. Thus the Argentine Republic will probably receive 370,000 new-comers this year and Brazil 150,000, against 120,000 in 1888.

What we have stated will suffice to show the magnitude of their trade and the strong hold which Europe has on it, the vast amounts of capital invested by the latter and the at present satisfactory nature of these investments now that the Senate of Peru too has concluded to ratify the Grace contract. It also shows that considering our steadily-increasing heavy importation of South American products, the countries down there do not take

American domestic goods to the extent that might be expected, in view of our proximity to them and the generally desirable quality of those goods. In fact, in a great many instances these goods of ours are too good. Certain cotton goods, for example, which Manchester furnishes, flimsy, it is true, but well finished and cheap, are just what the dealers want, who get credit granted them besides. The bulk of the South American trade is in dry goods, and seven-eighths thereof in cotton goods, light and handsome printed fabrics predominating. If New England and the South, with their largely increased capacity of production and facility of shifting from one line of goods to another, were to study closely the wants of South America in cotton goods, there would be every probability of the opening of an entirely new and almost unlimited field, for many of the light tissues would sell also in Asiatic countries. Whatever the result of the conference may be, we shall have to adapt certain goods we manufacture more to the necessities of tropical America if we want to compete in the latter with Europe. Our not doing so has been one of the chief causes why the balance of trade, as shown, has more and more run against us. The competition in cotton manufacture between New England and the South imperatively demands a larger and more varied outlet for the same.

While Europe, through trade, enterprise and capital, as well as through commercial treaties—yet many years to run—has such a firm hold on Spanish America and Brazil, the formation of a customs union with them turned against Europe is for the present beset with difficulties as good as insurmountable. It will be different eventually. The customs union will come, but we shall have to strive hard to create a line of goods in the various branches sufficiently cheap, yet of a handsome exterior, to supersede the European makes. Nevertheless we are glad that the conference is being held, because it can only do good in the end. It may not be pleasant to have the truth told us on some subjects, but it will prove beneficial if we profit by it. Even supposing that the results to be obtained do not come up to the expectations of the people at large, it can only do good that the foreign delegates, during the trip they will make North, West and South, shall have an opportunity of seeing what the country really is and what state of material and intellectual advancement the United States have reached since the war. If in modern invention we have attained to almost incredible heights in most branches of human activity and stand therein fully on a par with Europe, it is good that our Southern friends should see it and know it. It will smooth the way for future negotiations.

The English Merchandise Marks act has now been in force long enough to allow of the publication of the first report of the Commissioners of Customs, for the year ending March 31, 1889. Ignorance of the law and doubts as to its scope have probably had much to do with the number of cases which have been construed as infractions of the act. During the period stated the number of stoppages of goods for bearing marks con-



trary to the act amounted to 7876, the number of packages affected by these detentions being 217,458, of which one-half were made at the port of London. Germany was the greatest sinner, in the eyes of English officials, the detentions numbering 2898, while the United States are on record with 378 detentions, involving 20,595 packages. The commissioners note that large quantities of goods are now imported without any marks at all, and they express the belief that labels bearing false trade descriptions are placed on many goods after they have entered. Quantities of labels and tickets have been detained as evidently intended to be placed on goods for sale in England, so that, in spite of some doubts as to the legality, they have stopped them until the importer satisfied them that they were to be truthfully appended to goods of the description indicated therein. Another perplexity arises with respect to wares from English-speaking countries. Large quantities of goods are imported from America (often in transit) bearing English wording, such as steel goods marked "Warranted best cutlery," &c., and there is nothing to distinguish them on the home or foreign market from English-made goods. This appears, the commissioners say, to give goods made out of the United Kingdom, and in most cases not even in an English dependency, an advantage over other foreign-made goods which may not have been intended by those who framed the act.

#### Recent Developments in Mexico.

Since we last referred to the subject of Mexican progress, in May, there has been considerable activity in financial matters, in railroads and public works, as well as in the extension of industries. In June Mexico and Japan signed a treaty which constitutes an entirely new departure in Japan's foreign relations, its most important feature being the complete elimination of "exterritoriality"—that is to say, Mexicans in Japan will be subject to Japanese laws and jurisdiction in the same manner and to the same extent as Japanese in Mexico to Mexican laws. It has an indirect bearing on the treaty in course of negotiation between the United States and Japan, for which the above agreement serves as a model, and is consequently of great value to Americans who propose to engage in railroad-building and other enterprises in Japan. The Japan Steamship Company propose to establish a line between Acapulco, on the Pacific, Japan and China. Another line is to connect Genoa, in Italy, with Vera Cruz, via the West Indies.

The late granting of a charter for the establishment of a bank at Hermasillo, Sonora, is important, inasmuch as the Secretary of the Treasury, Don Manuel Dublan, upon thorough investigation has found that the National Bank of Mexico's claim to monopoly as a bank of issue has no legality under the constitution. Hitherto new banks had to buy the charter of some old bank in order to circumvent by priority the exclusive privilege of the National Bank. There will be no further necessity for this, so that banking with Mexican, European and American capital will receive a great impulse in Mexico, much to the convenience of commerce,

agriculture and mining, &c., all over the country. In August it was reported that New York bankers are interested in the proposed new loan of \$35,000,000 in gold, which is to extinguish subventions due the Central, National and Vera Cruz railways and other similar obligations of the Government. It was estimated that this would effect a net annual saving to the Treasury of some \$2,000,000. Bleichroeder, the Berlin financier, is also keeping an eye on the project, and the money is also ready in London, so that the Mexican Government will be easily able to place a loan of the kind when it is prepared to move in the matter. Outside of their purchases of stocks and bonds of the Central and National railroads, English capitalists have in various ways invested \$50,000,000 in Mexico during the last two years, showing that they have confidence in Mexico's future.

An important contract was signed on August 28 between the City of Mexico and Read & Campbell, large English contractors, for the extension of the valley drainage tunnel four miles, making the entire length of the tunnel nine miles and three-quarters, the work to be completed within three years after signing the contract. The tunnel is to connect with the canal that is to convey the surplus water beyond the valley, and takes the place of the projected deepcut. The firm hold a sub-contract from the Mexican Company of London, Limited, one of the strongest groups of capitalists operating in Mexico. This concern have been negotiating for some time past with Mr. Richard Holey, of Mexico, for the purpose of purchasing his iron works and iron mines situated at various points along the line of the newly-projected railway between Pachuca and Tampico. An extensive steel plant is to be established for the manufacture of rails, President Diaz cordially encouraging the scheme. The work of improving the port of Tampico is to be hurried, as the work done in Vera Cruz harbor will not have the desired effect. On August 31 engineers commenced work on the bar of Tampico.

Railroad-building in Yucatan on the Mérida-Mexico line has received a great impetus, and an exodus of negro laborers has set in from Trinidad, in the West Indies, to Yucatan, to avail themselves of the comparatively high wages there paid—something like \$25, gold, per month and found. Yucatan has become rich through the enormous extension of its hemp culture and the doubling in value of the fiber within the last twelvemonth. The Government, under the change of banking rules above alluded to, has authorized the establishment of a bank at Mérida, with permission to do a business of discount, deposit and circulation.

New railroad schemes are rife in Mexico. Thus the Mexican Pacific Railway Company recently sent a party of engineers to the frontier of the State of Tabasco to begin surveys for the broad-gauge line westward to the Pacific Ocean, and at the same time another party of engineers are locating that portion of the line running eastward from the Pacific port of Tonala. The road will secure a connection with the City of Mexico by the Cordoba and Tuxtepec road, now in process of construction. This connection will give the country a military line of communication to the Guatemalan frontier and thence into the rest of Central

America. It is furthermore known that a line to the British colony of Belize is projected, money being already pledged in London for its construction. It is indeed now certain that the southern portion of Mexico will within four years have an extensive system of railways which will open up fertile regions. English capital is behind the Mexican Pacific Railway as well as the Mexican Southern or Oaxaca road, now under survey. It is estimated that British investments in railways in the southern portion of the country will within six years reach at least \$30,000,000. There is at present even a decided movement in the City of Mexico on the part of English and American capitalists in the direction of acquiring sugar estates, and Louisiana planters are there looking out for good lands in "Tierra Caliente," the hot region of the republic. It was announced lately that the famous sugar estate belonging formerly to Señor Mendoza Cortina, at Cuautla, State of Morelos, had been transferred to English and American parties for \$250,000. Guadalajara is to have two manufactories of linen and one for the extraction of fibers. A silk factory is being established in the same city.

To speak of the activity that is being displayed this year in mining in Mexico would lead us too far. Suffice it to say that at no time has Mexico been in as flourishing condition as at present; that consequently there is every inducement to cultivate business relations with the sister republic.

## CORRESPONDENCE.

### Buying Irons by the Fracture

To the Editor: An illustration of the mistakes that are likely to be made when purchasing foundry irons from fracture is furnished by the following experience: Both the irons A and B are well-known Southern brands, *a*, *b* and *c* representing lots received by a foundry firm at different times. A is an open-grained "American Scotch" No. 1 iron by fracture, whereas B is a close No. 2, for which the firm have been paying \$2 less per ton than for A. The latter iron worked satisfactorily at first, but after a time began to cause too much shrinkage and to impart brittleness to the castings, and upon investigation of the cause of the trouble it was found that the last two lots received analyzed quite different from what did the first one, containing less graphitic carbon and much more phosphorus. The close-grained iron B, which is selling at \$2 less per ton than A, carries 50 per cent. of scrap and has always given satisfaction, and the reason is explained by the analyses of same.

The iron C is another open-grained high-priced "American Scotch" No. 1 iron by fracture, which was tried by another firm and rejected on account of the brittleness which is imparted to the castings. D is a comparatively low-priced close-grained iron, the analysis of which, however, shows it to be an iron above the average for foundry purposes, which has also been proved by actual experience with it in the foundry:

	A			B			C	D
	<i>a</i>	<i>b</i>	<i>c</i>	<i>a</i>	<i>b</i>	<i>c</i>		
Graphitic carbon...	3.03	2.09	2.21	3.26	3.15	....	2.46	3.48
Combined carbon...	0.23	0.55	0.53	0.04	0.45	0.08	0.55	0.11
Silicon,....	2.08	1.21	1.38	3.81	2.46	3.87	1.85	1.95
Manganese....	0.40	0.50	0.29	0.16	....	....	....	0.05
Sulphur.....	0.01	tr.	0.01	0.05	....	....	0.01	0.03
Phosphorus...	0.68	0.97	1.00	0.50	0.54	....	0.96	0.48

Yours truly, Wm. MOLIN.  
NEW YORK, September 26, 1889.

## The Charcoal Iron-Workers.

### TENTH ANNUAL MEETING.

(Continued.)

Our account of the proceedings of the recent meeting of the United States Association of Charcoal Iron-Workers ended with the arrival of the members at Duluth, Minn., on Saturday, the 21st inst. Immediately after dinner the party proceeded by way of the St. Paul and Duluth Railroad to West Duluth, some four miles distant, where important manufacturing enterprises have been located. The blast-furnace of

THE DULUTH IRON AND STEEL COMPANY was first inspected. The plant is in an advanced stage of completion and will be ready for operating about the 1st of November, although the owners, who are local capitalists, have not yet decided whether to blow it in then or wait until spring. It was designed by John Birkinbine, who has also supervised its erection. The buildings are constructed of red brick and iron and are not only substantial but present a very handsome appearance. The draft-stack is also of brick. The casting-house and furnace-stack are completed, the engine-house is having an engine installed, the stoves are about finished, the boiler-house is well under way and the hoist and stock-house alone remain to be added. The blast-furnace is 16 x 75 feet. The stoves are of fire-brick of the Gordon type, and were erected by Gordon, Strobel & Laureau, of Philadelphia, each of the three stoves being 18 x 60 feet, and they are together intended to heat 20,000 cubic feet of blast to 1400° F. The blowing-engine was built by the Weimer Machine Company, of Lebanon, Pa., and has a 90-inch blowing-cylinder, a 42-inch steam-cylinder and 48-inch stroke. The engine-house is large enough to contain three engines, two of which are to be added when a second furnace is built, which may be undertaken next spring. The boiler-house contains 16 boilers which are peculiarly arranged, operating as eight double boilers. The upper boilers have two 16-inch flues and are 48 inches in diameter, 36 feet long, while the lower boilers are 42 inches in diameter and 29 feet long. A foundation has been laid for eight more. The stock will be raised to the top of the stack by an inclined-plane skip-hoist, which will be 150 feet in length and will be carried above the top of the boiler-house down to the stock-house, located along the St. Louis River, where a dock has already been built to receive stock. The owners of this furnace expect to be able to secure coke at Chicago prices or but a little in advance of them, while they of course have an advantage over lower lake furnaces in being very close to the Minnesota ore mines. The freight which distant furnaces have to pay on pig-iron to reach the Duluth market will in itself afford a good margin to protect the local producers. This furnace enterprise has attracted much attention by reason of the published intention of the owners to make their own coke at the furnace from coal obtained from the Connellsville region or elsewhere as may be expedient. They propose to carry out this scheme after the furnace has been blown in and other questions are settled. The coke-ovens have not yet been erected.

The Minnesota Car Company's Works, lying adjacent, were hurriedly visited. This is a very extensive plant and was but recently described in *The Iron Age*. It owes its origin to capitalists of Richmond, Va., formerly connected with the Tredegar Company and other manufacturing enterprises of that city, who were induced to locate at Duluth by

townsmen of theirs who had settled at Duluth and had formed a very favorable impression of its advantages for a car-building works. The citizens of Duluth gave substantial encouragement to the enterprise by donating an extensive tract of land. Four large buildings and a number of small auxiliary structures have been erected. One building, 30 x 300 feet, contains a rolling-mill and forge; another, 61 x 385 feet, is used for the foundry for car-wheels and general castings; another, 97 x 527 feet, is to be used as an erecting-shop, planing-mill and machine-shop, and the fourth main building, 58 x 362 feet, will be the paint-shop. There are in all six departments in these four buildings. A large part of the machinery is in place, and the works are expected to start in regular operation in two or three weeks. The foundry made its initial heat on the day of the visit, when some plates for the rolling-mill were cast. This foundry is specially notable on account of its conveniences for handling ladles, flasks and castings. A system of overhead trolleys has been put in by the Detroit Foundry Equipment Company. Power is communicated to the trolleys by belts, and they are guided and controlled by wire ropes which extend through the foundry within easy reaching distance of the workmen on the floor. The car-works will start with large contracts which have already been secured. Close relations have been established with the Iron Car Company of New York, who will take contracts for cars to be made by the Duluth works. On the 1st of October the name of this corporation will be changed to Minnesota Iron Car Company. In the spring a tube-works and a malleable-iron foundry will be built to enable the company to engage extensively in the manufacture of iron cars which will be constructed mainly of tubes.

Returning to Duluth a visit was made to Alexander McDougall's ship-yard, in which the

#### CIGAR-SHAPED STEEL VESSELS

are built which have recently attracted much attention in lake shipping circles. A partly-completed vessel was on the stocks, which will make the third built of this type. It is 103 feet long and will hold 2700 net tons of cargo. While the general shape of this vessel is circular, with both ends tapering almost to a point, the bottom is practically flat and without a keel, except immediately at the stern, which terminates in a straight stern-post to hold the rudder. The boat has a double bottom and a hold separated from the cargo space by a floor. This hold is divided into eight compartments which are filled with water for ballast, which will weigh about 700 tons. On the deck two small circular houses or turrets are built for the working crew, one house forward and one aft. This boat is intended to be used as a barge and will have no motive power of its own. In future constructions experiments may be made with propeller machinery. A boat of this character is built in about 90 days. The next two vessels to be built at this yard will be of larger size and will hold 350 tons more. Captain McDougall estimates that boats of his design lose 75 per cent. of the rolling motion of vessels of the ordinary type and 50 per cent. of their pitching motion. They set very low in the water and the waves break over them freely. It has been demonstrated by the boats already in use that their peculiar shape enables them to be towed with much less expenditure of power than ordinary vessels, so that greater speed is made. They pay but one-third of their freight earnings for being towed, while other vessels pay one-half.

A steamboat ride in the harbor and for a short distance on Lake Superior was then

provided through the courtesy of the citizens of Duluth. The huge wheat elevators which stand on the water-front were observed by the party with much interest, the commercial advantages of Duluth were universally conceded, its beautiful harbor was greatly admired, and on returning toward the city its picturesque surroundings were fully appreciated.

In the evening the visitors were banqueted at the Spalding Hotel, a number of the prominent citizens of Duluth honoring the occasion with their presence. The special feature of the menu was planked white fish, on partaking which the conquest of the tourists by the people of Duluth was completed. An unconditional surrender was made, and thenceforth every member of the party was a confirmed believer in the exalted destiny of the Zenith City, the only doubt remaining in his mind as to whether its expected population of 500,000 would be attained in 10 years or in 15. Following the banquet an address of welcome was made by Prof. Wm. F. Phelps, secretary of the Chamber of Commerce, who called the attention of his guests to the rich promises for the future held forth by the great mineral resources of the vicinity. President Bean responded in behalf of the association, thanking the citizens of Duluth for their cordial and most hospitable reception. Justice Cox, Jr., of Philadelphia, was then called upon as a representative of Pennsylvania and made a very graceful speech in behalf of the Pennsylvania contingent. W. H. H. Stowell, secretary of the Duluth Iron and Steel Company, followed with a practical address on the advantages of Duluth for commercial and manufacturing undertakings. The concluding speech was made by J. W. Nesmith, of Denver, Col., who voiced the sentiments of everybody present when he expressed the pleasure he felt in meeting the citizens of Duluth under such agreeable surroundings.

Sunday was passed quietly, most of the party being kept in-doors by the first rainy day of the trip. A number of the visitors attended church, but a few adventurous spirits were not deterred by the rain from visiting West Superior to see some of the most important features of that city, which is separated from Duluth by the St. Louis River.

#### Monday's Proceedings.

At 7.30 Monday morning, the 23d inst., the party embarked on a special train which had been tendered for their use by the Duluth and Iron Range Railroad and started for the famous Vermilion iron-ore mines. The run of 27 miles along the shore of Lake Superior to Two Harbors, where the ore-docks are located and the ore of the region is transferred to vessels, was quickly made. The docks are two in number, with pockets on each side of them and double-track railroads running out to their extreme ends. The docks are 1100 feet long from the beginning of the pockets, or bins. One is 35 and the other 40 feet high. There are 303 bins in all, some having a capacity of 150 tons, while the others will hold 110 tons each. At these docks the feat has been accomplished of loading a 2200-ton vessel in two and one-half hours. The storage capacity of the dock is 38,000 tons. With vessels arriving regularly 200,000 tons per month could easily be handled. Electric lights on the docks enable work to be prosecuted by night as well as by day.

The railroad company's shops are also located at Two Harbors. Eight excellent brick buildings are used, all of which are connected by storm passages in the winter. The company have their own foundry and machine-shop, smith-shop and boiler-repair shop. The entire plant is lit by electricity. A steam tug for harbor work has been found a useful adjunct. The entire



length of the railroad at present is 115 miles, and it is equipped with 34 locomotives and 1100 cars. The grades on this road being very heavy in some places, running up to 185 feet to the mile in one instance, it has been found desirable to equip all cars (passenger, freight and ore cars) with Westinghouse air-brakes. A powerful eight-wheel locomotive is required to haul the usual ore trains, numbering 20 24-ton cars.

The train arrived at Tower, 68 miles from Two Harbors, at 11.15, and the party at once proceeded to

#### THE MINES OF THE MINNESOTA IRON COMPANY.

The first place visited was the stone-pit, which had been excavated to the depth of 100 feet and for 700 feet in length before under-ground working began. The walls of the vein were here distinctly defined and were remarkably regular. At the heading the body of ore exposed was 90 feet in width. The hoisting machinery was examined by the party with interest. There are four hoisting plants, each operating several shafts and together raising ore from 11 openings. Another hoisting plant of larger capacity than any now in use is in course of erection. Some of the ore is raised from the pits vertically, while in other cases slopes run down at an angle of 65°, the ore bodies standing almost vertical. The lowest level now being worked is about 300 feet from the surface. The top of the range is about 1000 feet above the level of Lake Superior. A number of the openings were visited, and as each was examined the immensity of the ore deposit before them was more and more forcibly impressed upon the visitors. They further observed that in every case mining operations had begun at the very surface in pay ore. As the ore lies in lenses its width varies, and occasionally a fault is encountered which requires prospecting to ascertain where the ore will next be found. Diamond drills are used for this purpose, and they have already penetrated ore bodies in sufficient quantity and extent to assure the permanence of this mining region. The company have shipped thus far in the season between 500,000 and 525,000 tons of ore. Last month they shipped 57,000 tons. Air-compressors are used in drilling, and electric lights enable double shifts of men to be worked throughout the mines and yards. They employ 1130 men, and their pay-roll runs from \$65,000 to \$70,000 per month. They pay 90 cents per ton freight to the railroad company for transporting the ore to Two Harbors. The character of the ore is very well known. It is a hard specular red hematite, which will absorb very little moisture, very rich in iron, low in phosphorus and in great demand for Bessemer steel. The following table shows an average of samples taken from cars on their way to the docks during this season, representing a vast number of determinations:

Months.	Iron.	Phos.
April.....	68.29	0.039
May.....	67.07	0.048
June.....	67.70	0.050
July.....	67.56	0.051
August.....	67.58	0.049
Averages.....	67.64	0.047

At 1 o'clock the train was sought again, and a run was made to Ely, during which a lunch was served by the Chamber of Commerce of Duluth, and the tourists did ample justice to it. Arriving at Ely,

#### THE MINE OF THE CHANDLER IRON COMPANY

was visited. Thus far this mine has been operated by open cut, but under-ground workings are just beginning. While the ore obtained here is similar in composition to that mined by the Minnesota Iron Company and is a high-grade Bessemer, it

appears to have been pulverized by some convulsion of nature and is therefore much more easily mined, requiring less blasting. But while it is not a lump ore, the small particles are too hard to be crushed easily like the Gogebic and Menominee ores. The Chandler ore absorbs more moisture than the Minnesota Iron Company's ore, owing to its physical structure, and is slightly less valuable on that account. Some 450 men are employed by the company. They work double turn, electric lights being used at night. Thus far this season the company have shipped over 250,000 tons and expect to reach 300,000 tons before navigation closes. It will be a good record for a new mine which forwarded only 55,000 tons last year. The freight charge on this ore is \$1 per ton to Two Harbors.

The Pioneer Mining Company have a mine near Ely which, however, was not visited. They have begun shipping this season, but only in small quantities. The ore is similar to that of the Chandler Mine. The output next year may run up to 50,000 tons. Other mining properties in the vicinity are in various stages of development, but some of them will be obliged to wait for an extension of the railroad line to enable them to start operations. Outcroppings of ore have been traced all the way to the Canadian boundary on the east and for a long distance west of the present developments, and other railroads have been projected to tap the ore fields. The Duluth and Winnipeg line, which is to run some 60 miles west of the Iron Range road, is expected to make an ore carrier of importance.

It was observed at all the Vermilion range mines that preparations were being made to store large quantities of ore during the coming winter, and it is now deemed highly probable that the 900,000 tons which the mines of the range will ship this season will be exceeded 50 per cent. and perhaps more next year. The ore docks can easily handle a much larger business than they have taken care of this year.

At 2.30 the return trip was begun, and at 7 o'clock the party were landed in Duluth after having passed a most pleasant day, although the skies had been threatening and rain occasionally fell. An interesting incident of the trip was the view from the top of the hills at Tower of the beautiful sheet of water known as Vermilion Lake, with its 400 wooded islands. The water from this lake finds its way into Hudson's Bay, so that the party stood on the water-shed of the continent, marking the southern boundary of the arctic system of tributary streams. At Hinsdale, along the line of the railroad, they further caught a glimpse, as the train passed swiftly along, of the granite quarries from which the stone was taken to build the Auditorium in Chicago.

#### Monday Evening.

At 8 o'clock a business meeting of the association was held in the Spalding Hotel at Duluth. The Committee on Nominations reported, recommending the following list of officers: For president, W. N. McGugin, of Olive Furnace, Ohio; for vice-presidents, J. W. Noble, of Anniston, Ala.; E. L. Foote, of St. Louis, Mo., and M. R. Hunt, of Ashland, Wis.; for secretary and treasurer, John Birkinbine, of Philadelphia; for Executive Committee they recommended that the present officers be continued—namely, Joseph D. Potts, of Philadelphia; W. W. Lobdell, of Wilmington, Del., and J. C. Fuller, of Philadelphia; in the Board of Managers they suggested some changes, the list as recommended covering every prominent iron-producing section in the country: The following is the personnel of the Board of Managers: Joseph D. Potts, Philadelphia; J. C. Fuller, Pine Grove

Furnace, Pa.; John R. Whitney, Philadelphia; L. Heber Smith, Joanna Furnace, Pa.; A. G. Curtin, Jr., Roland, Pa.; R. H. Lee, Lewistown, Pa.; John Birkinbine, Philadelphia; Percy Warner, Warner, Tenn.; J. J. Traver, Carter's Furnace, Tenn.; Charles H. Brown, Knoxville, Tenn.; W. H. Hood, Ishpeming, Mich.; V. K. Moore, Detroit, Mich.; J. C. Ford, Fruitport, Mich.; W. A. Miles, Copake Iron Works, N. Y.; M. Lyman, Waverly, N. Y.; Walter Crafts, Anniston, Ala.; A. R. Mackintosh, Hanging Rock, Ohio; H. R. Stoughton, Shelby Iron Works, Ala.; Willard Warner, Tecumseh, Ala.; H. A. Crawford, St. Louis, Mo.; W. H. Lee, St. Louis, Mo.; W. W. Jacobs, Hartford, Conn.; Charles W. Barnum, Lime Rock, Conn.; M. Hoagland, Rockaway, N. J.; I. M. Bean, Milwaukee, Wis.; C. E. Coffin, Muirkirk, Md.; George G. Lobdell, Wilmington, Del.; E. W. Creighton, Oswego, Ore.; Jacob Wisler, Max Meadows, Va.; E. Sjosdedt, Katahdin, Maine. The report was received, and the officers recommended were duly elected for the ensuing year. The Committee on Courtesies reported a series of resolutions thanking the citizens of Milwaukee, Ashland, Duluth and West Superior for the favors received at their hands.

Secretary Birkinbine then read a paper which had been prepared by Superintendent Ford, of the Spring Lake Furnace, at Fruitport, Mich., giving a record of the work done by that furnace since its erection in 1879. The furnace is operated with charcoal, is 10½ x 45 feet, 5-foot crucible, 5-foot bell, has a 60-inch Wiener blowing-engine with 4-foot stroke, uses Lake Superior ores and makes pig-iron with from 92 to 95 bushels of charcoal, turning out from 48 to 51 tons of pig-iron daily. On one blast it turned out 20,451 gross tons of pig-iron, averaging 59 tons daily, consuming 95 bushels of charcoal.

A paper by W. S. Mallory, of Chicago, on "Spirally Welded Steel Tubes," was then read. He described the process of manufacturing tubes at East Orange, N. J., which is pursued by the Spiral Weld Tube Company, of which James C. Bayles is president. The lightness and strength of these tubes were shown by tables of dimensions and weights and records of tests. Their use for various purposes was described. The interesting fact was stated that pipes of any length could be turned out by this process. This is made possible by the fact that the strips are first welded at their ends, which can of course be done indefinitely, and the machine will then continue to form, wind and weld the strip as long as it is being received. A 10-inch tube 57 feet in length was made, but of course had to be cut up for shipment. From small diameters up to 24 inches are made at present, and machines are now being built to turn out 48 inches for tank-cars and other constructions in which riveted work has heretofore been employed. The welded pipe will be very much cheaper. The growing demand for these tubes, it was stated, will render necessary the establishment of works in the near future at points in the West and South, on the Pacific Slope and in Canada.

Secretary Birkinbine and Mr. Noble, of Alabama, both of whom had examined the spiral weld pipe, made some remarks in commendation of it, Mr. Noble dwelling particularly on the construction of the hub-coupling, which he regarded as a most ingenious device.

A paper by E. Sjosdedt, of Katahdin, Maine, on "Magnetic Survey and the Magnetometer," being an abstract of Professor Thalen's paper on that subject in the "Jernkontoret Annaler" for 1879, was then presented.

The uncertainties attending the use of the miner's compass were first explained.

The magnetometer, as constructed by Professor Thalen, consists of a compass-box with a diameter of about  $3\frac{1}{2}$  inches, graded in whole and half degrees. A horizontal arm extends at right angles to the diameter through the zero point, to serve as a sight when running a line and to carry the fixed magnet, which is placed in a parallel position to the arm. A bar of soft iron is placed in a perpendicular socket in the compass-box. The instrument is supported on a vertical axle, is provided with a spirit level and is mounted on a tripod. The magnet and the iron bar cause a deviation of the compass-needle. This deviation is measured and the inclination of the terrestrial magnetism can be ascertained, as well as the horizontal influence; also the vertical component of the magnetism. Thus the location of the body of ore can be ascertained even if directly under the needle, and accurate determinations are made possible. The operation of the instrument is necessarily intricate, but the paper of Mr. Sjosdelt demonstrates quite clearly how it is used.

Mr. Traver, of the Knoxville Car-Wheel Company, showed some specimens of ores from Carter County, Tenn., which analyzed 67.91 iron, 2.01 silica and 0.061 phosphorus, stating that they were found 20 miles from Johnson City in a deposit  $2\frac{1}{2}$  feet thick and outcropping  $2\frac{1}{2}$  miles. The deposit has been but slightly developed. He also showed other samples of his local ores, such as are used in making car-wheel pig-iron in his company's furnace. An interesting discussion followed, in which Messrs. Bean, Cook, Birkinbine, Cox, Noble and others participated. Mr. Cook showed a number of specimens of New Jersey magnetic ores, such as are used in Eastern Pennsylvania furnaces for making foundry and mill irons, also ores from Seisholtzville, Pa.

Mr. McGugin then called attention to the existence in Lawrence County, Ohio, of deposits of limestone ore, limestone and coking coal in the same hills, in alternating seams. The coal is lowest, lying in a  $5\frac{1}{2}$ -foot vein, the limestone comes next in a 7-foot deposit, and the ore lies at the top. He explained that these deposits had hitherto been undeveloped, owing to the lack of transportation facilities, but that railroads were now being constructed near them, when the opportunity would for the first time be afforded to utilize them.

The meeting then adjourned.

**The Accident at Braddock.**—A very serious accident occurred at the Edgar Thomson Steel Works of Carnegie Bros. & Co., Limited, at Braddock, Pa., on the night of the 26th ult. The accident was caused by the bursting of furnace "C," which threw a mass of molten metal on the men standing near it, burning them in a dreadful manner. The furnace had not been working properly during the day, and during one of his tours through the works Captain Jones stopped to see if he could not ascertain the cause of the trouble. He had scarcely arrived at the furnace when the gang of men at work attempted to tap it. The tapping-hole at the bottom of the furnace had become clogged up, however, and the usual sledging process was of no avail. They could not get the metal started to running and several crowbars were inserted in the hole. About ten men were grouped around it, when suddenly the front furnace for fully 7 feet about the tapping-hole fell out. The great mass of molten metal gushed forth, and before the men could get out of the way it had splashed over them, mutilating and burning them. Nearly all of those who were about the furnace were more or less injured, including Captain Jones, who, with some of the workmen, has since died.

## Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., October 1, 1889.

The annual report of the Secretary of the Navy, next to that of the Secretary of the Treasury, will be the most important of all the official exhibits from the heads of executive departments. During the seven months he has been at the head of the naval administration Secretary Tracy has not only accomplished a great deal of work, but he has been steadily busy preparing his recommendations for a grand project of naval construction and the improvement of navy-yards so as to adapt them to the requirements of a modern navy. One of the most important steps proposed by the Secretary is if possible to change the embarrassing limitation placed upon the prices to be paid for ships by asking Congress in its appropriations simply to authorize the construction of vessels representing so many tons displacement, leaving it to him to determine how the tonnage shall be distributed among ships of various sizes and to be paid for at prices regulated by competition among builders. Under such an arrangement Congress would simply appropriate in lump and the Secretary, upon the recommendation of the Naval Board, would be able to arrange the number, size and character of the new ships according to the whole amount at his disposal. In the case of the 2000-ton cruisers just readvertised and the 3000-ton cruisers to be built at New York and Norfolk the Congressional limitation prevented the Secretary from awarding the contract to private bidders, although the excess of the bids over the Congressional limitation was comparatively small.

In the recent conferences between the Secretary and the Naval Board the subject of additional vessels for the navy has been carefully considered. Several schedules of ships were submitted, but no final action has been taken. The numbers range from 10 to 18 vessels of different tons displacement. Since the award of the first contracts and the building of the first ship the constructors, ordnance experts and engineers of our navy have made wonderful strides in the direction of development. The solicitude shown by Secretary Whitney as to the ability of our own officers to build ships able to compete with English designs and armaments has been most emphatically dissipated. The English model, for which he paid such a large sum and for the construction of which preparations were made some months ago at Norfolk, it has been discovered, after careful computations, will not float, and the Charleston, modeled after the English ship built for the Japanese Government, is practically a failure, while the Baltimore, the latest of our American designed, engined and built ships, proves a grand success. When fully completed and armed she will be without exception the finest cruiser possessed by any Government in the world. The Cramps will realize at least \$150,000 in premiums under the bonus provisions for power and speed. Secretary Tracy is delighted with the performance of this vessel, and in his report will be able to demonstrate that with all England's experience and reputation as the builder of the most formidable war-ships afloat, the American naval experts and builders are already in advance of all nations. There is no doubt, if Congress will for once display an intelligent understanding of national interests and vote liberal appropriations for new ships, so that this new industry may be fully stimulated within two years, the superiority of American war-ships over the best English, German or French models will be so fully established that the nations of the world

will come to the United States instead of England for vessels for their navies.

The Secretary and the Philadelphians have fallen into opposing positions growing out of the assignment of the construction of the two 3000-ton cruisers to New York and Norfolk. The Philadelphia Representatives in Congress in 1882 quietly submitted to the passage of a bill to close such navy-yards as were deemed unnecessary. A board made a report descending upon the advantages of League Island for the construction of steel vessels of war and recommending improvements. Mr. Chandler, however, who was then Secretary of the Navy, in his annual report to the President, despite the favorable comments of the naval experts, recommended the closing of the League Island yard. Although through the influence of Representative Randall, chairman of the Committee on Appropriations, the Democratic House appropriated over \$500,000 for a dry-dock and sea-wall now being built, the yard is closed for the purposes of construction. The Pennsylvania Senators and Philadelphia representatives made an effort to secure the construction of one of the 3000-ton cruisers at League Island, but the Secretary replied that the yard having been closed under an act of Congress it can only be opened by a declaratory provision from the same high authority. The skilled mechanics for work on the armored-cruiser Texas and the 3000-ton cruiser just ordered to be built at Norfolk will be brought from Philadelphia. The great advantages of League Island meanwhile will remain unavailable until Congress acts, which may not be for some months.

Secretary Tracy said to the correspondent of *The Iron Age*: "I believe that now is the time to build modern ships of war just as rapidly as we can. We have already demonstrated that it is almost a waste of time to study foreign models for anything new and formidable in ships or guns. In our two or three years' application to modern ships of war we have surpassed all foreign designs. We are now building an American navy after American designs. We are no longer dependent upon foreign talent or plants. I think Congress will be alive to the situation and will be liberal. The work still unfinished and the ships proposed, if authorized, will give a great stimulus to the market for steel. There is no doubt of the Government being a large purchaser for some years, but of course this will depend upon Congress. Therefore it is to the interest of manufacturing districts where the work is done and agricultural districts where the food is raised for workmen who, by plenty of work, are able to pay good prices for the products of agriculture upon which they must live, to discriminate as to the persons they send to Congress."

Suits aggregating \$16,000 were filed in the Circuit Court, at Rockford, Ill., on the 28th ult., against the Rockford Plow Company. The creditors are the Rockford National Bank, \$3000; Second National Bank, \$5000; Rockford Bolt Works, \$2000; Charles Saunders, \$2500; A. D. Forbes, \$2500; Union Foundry, \$1000. The plow works claim to have assets far exceeding the aggregate of the amounts sued for. The company hope to secure some settlement of these claims and dismiss the cases next week.

It is reported from Milwaukee that the Illinois Steel Company intend to build a canal a mile and a half long from the harbor of Milwaukee to a point near the Bay View Rolling Mills. It is to be used in towing ore vessels from the harbor to the mills, thus saving an annual expense of \$30,000 for rehandling.



## OBITUARY.

CAPT. W. R. JONES.

Capt. W. R. Jones, general manager of the Edgar Thomson Steel Works, whose portrait we present herewith, died in Pittsburgh last Saturday night at the Homeopathic Hospital of injuries received in the recent terrible accident at that plant. His death was a surprise, as he was believed to be in no immediate danger. Captain Jones had a world-wide reputation in iron and steel circles and was universally esteemed by all who knew him. His salary and share of the profits from the production of the extensive plant exceeded, it is said, \$50,000 a year. The deceased was 50 years of age and leaves a wife and family.

Capt. William Richard Jones was born in Luzerne County, Pa., February 23, 1839. He was the elder child of Rev. John G.

teers, and was mustered in as captain July 20, 1864. He was assigned to the provost guard in Baltimore, and after the company's term expired was highly complimented. Honorably mustered out June 17, 1865, he again entered the Cambria Iron Company's service as assistant to the chief engineer, and as such assisted in the construction of the Cambria Company's Bessemer steel converting and blooming-mill plants. He subsequently became master mechanic and finally general superintendent of the Edgar Thomson Steel Company, and directed the building of furnaces A, B, C, D, E, F and G, the third of which was destined to become the cause of his untimely end.

His improvements and inventions have made these furnaces the finest in the world. Captain Jones's inventions are as numerous as they are useful. The first were "a device for operating ladles in Bessemer

Britain. In dealing with the workmen he was always open-handed, and during the great strike at Braddock last year he never made any move to start the works until he had first notified the leaders of the strikers when he was going to resume. During the trying times after the Johnstown disaster Captain Jones did noble work. He took several hundred workmen to the stricken city and was the coolest man there when clear-headed men were so badly needed. His charitable gifts were large, but were bestowed in a quiet way, and hundreds of poor people in Braddock have cause to bless Captain Jones and mourn his untimely death.

JOHN HOGAN.

John Hogan, a wealthy steel manufacturer at 243 Pearl street, New York, died suddenly at his home in Montclair, N. J., Monday night, of neuralgia of the heart. He was 63 years old.

FRED MESSER.

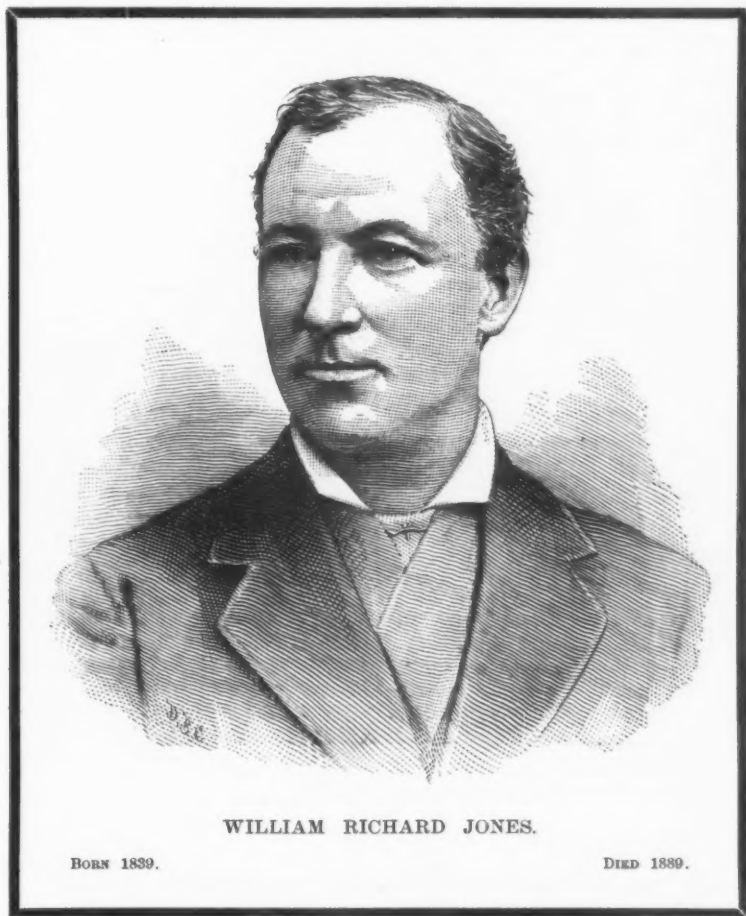
Fred Messer, aged 41 years, president and manager of the Beloit Iron Works, Beloit, Wis., died on the 27th ult., of typhoid pneumonia, after a week's illness. He was a very hard worker and had overtaxed himself in his duties and was much debilitated when he was taken sick. His death has created a vacancy in the business circles of that city which will not be easily filled, and the entire community mourn his death. He leaves a wife and one child.

JAMES IVES.

James Ives, who was the originator of the Mount Carmel Mfg. Company, the founder of the Hamden Iron Company and president of the Mount Carmel Bolt Company, died recently in his native town. He was closely identified with local interests, had been actively associated in years past with a needle factory and not long since established a screw factory.

Asa G. Neville, of Lazearville, W. Va., is the patentee of a new glass melting-pot, which he claims will revolutionize the flint glass trade. The pot differs from others in the method of heating and cooling the glass for working. The inventor claims that he can heat a new melt in one-half the time required in the old pots. After the glass has been heated, he says, it can be cooled off for working in 20 minutes. The pot can be heated with coal as well as with natural gas. The flame enters into the pot from the top and is mixed with hot air, the pot having but one flue. The flame coming in at the top is drawn out at the front. After the glass is melted the cap is put on the top and the same flue used to cool the glass for working.

Railroad-building in Africa seems to be booming. According to latest advices the Portuguese have surveyed the line of a route connecting Lake Nyassa with the sea. Work on the Congo Railroad has begun in earnest. On the 25th of last month a steamer sailed from Antwerp bound for the Congo and loaded with 1000 tons of rails for the Congo Railroad. A party of engineers and railroad-builders are to leave Brussels about the middle of October bound for the same destination. As soon as they reach the Congo they will at once go to work on the new road. They will reach the Congo at the beginning of the cool weather, and it is expected that rapid progress will be made during the winter months.



WILLIAM RICHARD JONES.

BORN 1839.

DIED 1889.

Jones, who emigrated to this country from Wales in 1832. His father's poor health compelled him to begin work at the age of 10, when he was apprenticed to the Crane Iron Company, of Catasauqua, in the foundry department, and later was placed in the machine-shop. In 1856 he moved to Philadelphia and went to work. From there he journeyed to Clearfield County, where he was engaged as a lumber man, raftsmen and farm hand until 1858. In 1859 he went to Johnstown and worked at his trade for the Cambria Iron Company. After working there three months he went to Chattanooga, Tenn., where he remained until the breaking out of the war, when he was compelled to fly North.

In July, 1862, he enlisted in Company A, One Hundred and Thirty-third Pennsylvania Volunteers. He was badly hurt at the crossing of the Rapidan before the battle, but refused to leave the ranks, although suffering greatly. At the expiration of his term he re-entered the service of the Cambria Iron Company. He soon after organized Company F, One Hundred and Ninety-fourth Pennsylvania Volun-

teers, and was mustered in as captain July 20, 1864. He was assigned to the provost guard in Baltimore, and after the company's term expired was highly complimented. Honorably mustered out June 17, 1865, he again entered the Cambria Iron Company's service as assistant to the chief engineer, and as such assisted in the construction of the Cambria Company's Bessemer steel converting and blooming-mill plants. He subsequently became master mechanic and finally general superintendent of the Edgar Thomson Steel Company, and directed the building of furnaces A, B, C, D, E, F and G, the third of which was destined to become the cause of his untimely end. His improvements and inventions have made these furnaces the finest in the world. Captain Jones's inventions are as numerous as they are useful. The first were "a device for operating ladles in Bessemer

### The Car-Service System.

The continued shortage of freight-cars is causing so much dissatisfaction that the railroad authorities are beginning to awake to the fact that something must be done to meet the requirements of shippers. It is proposed to bring into operation at Pittsburgh an organization similar to the car-service system which has been lately set on foot in Cleveland, and which has been working so well in Chicago for some time back.

The purpose of this association is to effect the rapid loading of cars by shippers and expeditious unloading by consignees and their return to the railroads owning them. Shippers will be allowed 24 hours to load from the time they receive the cars and consignees a like period, after which \$1 a day or a fraction thereof will be charged for detention, Sundays and legal holidays excepted. Receipts from this source will belong to the road on whose tracks the cars may be delayed, but private cars will be exempted from charge. On a good many roads there are stated charges for the detention of cars, but they are not always enforced, and to this reason may be traced one source of the shortage, because consignees hold cars for an indefinite time, using them for warehouse purposes as long as it suits their convenience.

The Cleveland Car Service Association have begun, and there is every possibility of the other roads leading out of Pittsburgh adopting this plan of expeditiously moving their freight stock in a short time. Freight agents favor the scheme, and they regard it as the only way out of the present shortage in the supply of cars.

**Exhaust-Steam Economizer.**—For the Webster Vacuum Exhaust-Steam Economizer, made by Warren Webster & Co., of Philadelphia, two important points are claimed—simplicity of construction and entire departure in principle when compared with pressure, coil or tubular feed-water heaters as applied for obtaining hot and purified feed-water for steam-boilers or manufacturing purposes. The operation of this economizer produces a partial vacuum within it, thereby accelerating the inflow of steam from the source of supply, and as the water and steam are brought in direct contact in a chamber below atmospheric pressure it is possible to heat a greater quantity and to produce better quality than can be obtained by a heater where the water is subjected to boiler-pressure. The economizer converts the water to be purified in vapor and reconverts the vapor back to a liquid state by the entering water to be purified, thereby preventing any loss of heat-units. The manufacturers have received testimonials from firms of the highest standing who testify regarding the excellent work done by the economizer.

Among corporations recently authorized to do business under the laws of Illinois are the following: Hercules Spike Company, at Chicago; to manufacture railroad spikes; capital stock, \$300,000; incorporators, Henry G. Bickwell, James White, Henry L. Norton. Marquette Iron Range Construction Company, at Chicago; to build a railroad from Ishpeming, Mich., to Lake Superior at Marquette, Mich.; capital stock, \$1,000,000; incorporators, Frank Butterworth, H. V. Harris and E. D. Comings. Chicago Grain-Door Company, at Chicago; to do a general manufacturing business; capital stock, \$15,000; incorporators, James H. Raymond, Irwin Veeder and Otto R. Barnett. Peoria Rolling Mill Company, at Peoria; to manufacture iron; capital stock, \$120,000; incorporators, William Jack, E. C.

Howlett and S. A. Kinzey. Bowerman Hot-Water Heating Company, at Chicago; to manufacture patented hot-water apparatus; capital stock, \$200,000; incorporators, William H. Craddock, S. Melvin Crane, W. J. Bowerman and others. Stearnes Mfg. Company, at Chicago; to manufacture wrought-iron ranges and heating and cooking apparatus; capital stock, \$50,000; incorporators, Alfred J. Stearnes, Samuel W. Joy and F. W. Walker.

### PERSONAL.

John Rinard, who for many years has been superintendent of the converting department of the Edgar Thomson Steel Works, has tendered his resignation, to take effect at once. Mr. Rinard will be succeeded by Mr. Harry Benn, who has been an *attaché* of his office for the past three years.

E. R. Baldrige, superintendent of the Blair Iron and Coal Company, of Hollidaysburg, Pa., has resigned that position and accepted the superintendency of a coal and coke company recently organized at that place.

John F. Fackenthall, formerly connected with the Durham Iron Works, of Riegelsville, Pa., has recently been appointed superintendent of the furnace plant of the Glendon Iron Company, at Easton, Pa.

William H. Wiley, of New York, the American correspondent of *Engineering*, has returned from Europe.

Mr. Robert P. Porter, Superintendent of the Census, has appointed Mr. Richard P. Rothwell, editor of the *Engineering and Mining Journal*, special agent to collect the statistics of the production of gold and silver in the United States and Territories.

The Secretary of the Treasury has accepted the resignation of Dr. James P. Kimball, of Pennsylvania, as Director of the Mint, to take effect October 15. Mr. Edward O. Leech, computer in the office, is now acting as director, with the understanding that he will be appointed to the directorship as soon as the office becomes vacant.

A. Magoon has resigned as general manager of the Rockbridge Furnace, at Goshen, Va.

Having completed his work at the Chester Rolling Mills, Chester, Pa., John E. Fry, formerly of Wheeling, W. Va., and Johnstown, Pa., has changed his address to P. O. Box 420, Norristown, Pa., for the present.

The improving demand for steel products and the higher prices now being realized will probably reanimate a number of plants which have for some time been lying idle. Among these is the steel plant of the Springfield Iron Company, at Springfield, Ill. The company ceased the manufacture of steel when the prices fell below the point of profit, but continued to turn out a heavy product of bar-iron. They are now understood to be making arrangements to resume work in their steel department. While they are prepared to make Bessemer-steel rails, it is not known as yet whether they will engage in that line or will confine their attention to special merchant steel.

A dispatch from Girard, Macoupin County, Ill., under date of September 28, says: "A rich strike of natural gas has been made on the farm of John Mayer, two miles east of here. Mayer was engaged in sinking a well, and after going down 44 feet struck a bed of rock. A drill was forced through the rock and instantly a

heavy flow of natural gas began. The orifice in the rock was piped and the gas was ignited above ground. A sheet of flame 6 feet high has been burning for 24 hours."

**Canadian Trade.**—The trade report of Canada for the last year shows that her dealings with the United States are heavier than with her mother country. Canada sold to the United States in 1888 merchandise to the value of \$42,572,065, and to Great Britain \$42,094,984, showing an excess of sales to the United States of \$500,000. The imports of the United States were \$48,481,848, \$9,000,000 greater than from Great Britain. The volume of trade with Great Britain—imports and exports—was smaller in 1888 than in any year since the formation of the Canadian confederation (in 1857), while the transactions with the United States were larger than any preceding year, except in 1882 and 1883. One-half the exports of Canada of lumber and other products are disposed of in the United States, and three-fourths of the minerals, two-thirds of the agricultural products, nearly one-half of her fish and 40 per cent. of her manufactured articles. The statement of imports and exports for August, just published, shows a decided increase in the volume of trade as compared with the same month last year.

A Fort Wayne (Ind.) dispatch states that negotiations are pending between an English syndicate and J. H. Bass for the purchase of the Bass Foundry and Machine Works, with its branch works in Chicago and St. Louis, together with a valuable charcoal furnace and iron-ore mines in Alabama. It is said that Mr. Bass refused \$3,000,000 for the property a year since.

The Pennsylvania Company have made a reduction in freight rates from Pittsburgh to St. Paul and Minneapolis, which went into effect on Monday, the 30th ult. The old rates were as follows: First class, 75; second, 62; third, 55; fourth, 38; fifth, 29, and sixth, 26. On iron and steel, less than carload lots, 26, and carloads, 23. The reduction will bring the rates down to 72½, 62, 39½, 32, 25 and 22½ in the respective classes, with iron and steel at 26 on less than carload lots and 22½ on carloads. The rate on glassware will be reduced from 42½ to 34½ from Pittsburgh to the points named.

Horace A. Taylor, Commissioner of Railroads, in his annual report to the Secretary of the Interior, discusses the railroad situation, declaring that in many sections of the West, conspicuously in Iowa and Kansas, the mileage of railroads is greatly in excess, so that either the investments cease to be profitable or rates are fixed so high as to be ruinous to traffic. Railroads and the public alike suffer in the effort to secure trade from competing centers, while no sufficient encouragement is given to local traffic. These road wars, the commissioner declares, "are in many, if not in most, cases devoid of palliation or excuse—inadvertently without reasonable cause and vindictively prosecuted with an utter disregard of their disastrous effects upon the interests of the companies engaged and the business public. They destroy or imperil the value of railroad securities and impose unjust burdens upon the commerce of competing sections, prevent stability in business and render the profits of the producer and the trader alike uncertain." In the opinion of the commissioner, a new bureau should be established in which to file full accounts of all the bonded roads.



# TRADE REPORT.

## Chicago.

Office of *The Iron Age*, 50 Dearborn street, CHICAGO, September 30, 1889.

A good strong market is reported in almost every branch of the Iron trade and prices continue to advance. The upward movement appears to be uncontrollable, and some of the most conservative houses that have heretofore endeavored to prevent prices from rising too rapidly have been obliged by circumstances to refuse to make open quotations, but are only naming prices for immediate acceptance. This is particularly true of those representing Pittsburgh manufacturers, the demand for whose products is constantly increasing in all sections which they can reach.

**Pig-Iron.**—The demand at present is coming from small consumers, whose necessities are compelling them to buy in sufficient numbers to make the volume of business quite large in Coke Irons. The supply now available appears to be so limited that it is no longer a question of price to effect a sale, but whether the Iron needed is to be had. Dealers are constantly receiving inquiries from consumers whose trade they had formerly been unable to secure, thus forcibly demonstrating the restriction of the supply. Charcoal Iron is not in such active request as Coke Iron, but occasionally a good sale is made, and prices are generally hardening. Makers are very firm, and refuse to make concessions, believing that prices must soon advance materially. Southern Iron is being offered to a very limited extent by the furnace companies themselves, but speculative lots purchased by outside parties some time since are now coming on the market, and can be bought at a trifle below makers' figures. Quotations are as follows for cash, f.o.b. Chicago: Lake Superior Charcoal, \$19 @ \$19.50; Local Coke, No. 1, \$17 @ \$17.50; No. 2, \$16 @ \$16.50; No. 3, \$15 @ \$15.50; Chicago and Bay View Scotch, No. 1, \$17 @ \$17.50; Bessemer, \$18.50 @ \$19; American Scotch (Blackband), No. 1, \$19.50 @ \$20; Jackson County, No. 1, \$18; Hocking Valley Soft, No. 1, \$18; Southern Coke, No. 1, \$16.75 @ \$17; No. 2, \$16.25 @ \$16.50; No. 3, \$15.50 @ \$15.75; No. 1, Soft, \$16.25 @ \$16.50; No. 2, Soft, \$15.25 @ \$15.50; Gray Forge, \$15.25 @ \$15.50; Mottled, \$14.50 @ \$15; Tennessee Charcoal, No. 1, \$18.50 @ \$19; Alabama Car-Wheel, \$23 @ \$24.

**Bar-Iron.**—Car-building being very active, the demand for Bar-Iron from that quarter is strong. Plenty of business is also being offered from other classes of consumers, although no very large inquiries are in the market at present. A very few belated season contracts are expected to come up soon, as prices are advancing so generally that such buyers can hardly afford to take further chances. Many mills are now out of the market, and those left are masters of the situation. One of them positively refused during the week to take an order for Car-Iron at less than 1.75¢ at mill, or 1.88¢ here. The valley mills are now making 1.70¢ at the mill their bottom price for very choice specifications, and it would not be surprising if 1.75¢ should be asked in a few days. Single Refined Iron is quoted at 1.85¢ at mill, although one or two makers will take a few orders at 1.75¢, with a 15¢ rate of freight to Chicago. Jobbers quote 1.90¢ for Common Iron to their largest customers and 2¢ to the ordinary trade. They state that their only trouble now is to get Iron from the mills, as they can sell it faster than it is received.

**Structural Iron.**—Heavy deliveries are being made, but new business is dimin-

ishing on account of the approaching close of the building season. Prices from mills still in the market are as follows, f.o.b. Chicago: Angles, 2.25¢ @ 2.35¢; Universal Plates, 2.40¢; Sheared Plates, 2.45¢ @ 2.50¢; Tees, 2.65¢ @ 2.70¢; Beams and Channels, 2.90¢. Small lots from store are sold at the following rates: Angles, 2.40¢; Tees, 2.70¢ @ 2.75¢; Beams and Channels, 3.40¢.

**Plates, Tubes, &c.**—Business has been very active in small lots. The demand from boiler-makers has been especially good. The month of September has been one of the best months in this branch for a long time. From store the following quotations are made: Iron Sheets, Nos. 10 to 14, 2.80¢; Steel do., 2.80¢ @ 3¢; Tank, Steel and Iron, 2.70¢; Shell Steel, 3¢; Flange, 3.50¢; Fire-Box, 4.25¢ @ 5.50¢; Ulster Iron, 3.75¢; Boiler-Rivets, 4¢ @ 4.25¢. In carload lots manufacturers make the following prices f.o.b. Chicago: Nos. 10 to 14 Iron Sheets, 2.65¢; Nos. 10 to 14 Steel Sheets, 2.75¢; Tank Iron, 2.50¢; Tank Steel, 2.60¢. On Boiler-Tubes 50 % off is asked for 1½-inch and less, and 55 % off for 2-inch and upward.

**Sheet-Iron.**—Manufacturers' agents now quote 3.15¢ at mill for carload lots of No. 27 Common, with very little available for October delivery. A good demand is still experienced and the anticipated shortage is beginning to be felt. Predictions are being freely made that 3.25¢ at mill will be touched next month. Jobbers advanced store prices 10¢ @ 100 during the week and now ask 3.50¢ for small lots of No. 27, with 10¢ @ 100 off on large orders.

**Galvanized Iron.**—A very heavy demand is reported, manufacturers' agents doing much more business than when extremely low prices prevailed. The railroad trade has greatly improved, five times as much Galvanized Iron now going in that direction as was the case but a few weeks since. Manufacturers' and jobbers' prices are now about the same—namely, 65 @ 65 and 5 %, according to quantity, for Juniata. The Charcoal grade is now practically obsolete, very little of it being carried in stock.

**Merchant Steel.**—While all grades are moving freely, Soft Steel is especially active and prices are continually stiffening. Makers quote as follows, f.o.b. Chicago: Spring Steel, 2.40¢ @ 2.50¢; Tire Steel, 2.30¢; Toe Calk, 2.40¢ @ 2.50¢; Open-Hearth Machinery, 2.25¢ @ 2.40¢; Bessemer Machinery, 2.15¢ @ 2.20¢; Solid Cast Plow Steel, 3¢; Open-Hearth Plow Steel, 2.40¢ @ 2.50¢. From store jobbers quote: Mild Machinery, 2.25¢ @ 2.35¢; Bessemer Machinery, 2.40¢ @ 2.60¢; Open-Hearth Machinery, 2.70 @ 3¢; Tire, 2.40¢ @ 2.50¢; Tool, 7.50¢ @ 8.50¢; Sheet, 7¢ @ 10¢.

**Steel Rails.**—Orders are being taken whenever they can be made to fit in with work already in hand, but the mills have been obliged to refuse contracts for delivery earlier than the last of November or in December. No orders have yet been booked for next year, although railroads would willingly begin to purchase now. Standard sections are quoted at \$33, and 35s and 40s at \$36 @ \$37. Light Rails are still in good demand.

**Track Supplies.**—Business in this class of products is constantly improving, and those who make a high grade are especially gratified by their increasing orders, showing that the cheap sellers are being filled up. Quotations are as follows, f.o.b. Chicago: Steel Splice-Bars, 2¢; Iron ditto, 1.95¢ @ 2¢; Spikes, 2¢ @ 2.10¢; Bolts, Square Nuts, 2.65¢ @ 2.75¢; Hexagon, Nuts, 2.80¢ @ 2.85¢.

**Old Rails and Wheels.**—Sales of Iron Rails have been made to a limited extent at \$24.75 @ \$25, Chicago, and \$25.25 at points in the interior. The supply is at present somewhat in excess of the demand, but holders are not disposed to make concessions to force business. Old Steel Rails are scarce and quoted at \$17 @ \$19, according to length. Car-Wheels have been sold in small lots at \$18.50, but consumers are not willing to pay this price for any considerable quantity.

**Scrap-Iron.**—The dullness which prevailed so long in this branch of trade has given way to activity, and dealers are in receipt of good orders for all kinds of Old Iron and Steel, except Cast, which is very dull by comparison. Dealers' quotations are as follows, per net ton: No. 1 Forge, \$20; No. 1 Mill, \$14.50 @ \$15; No. 2, \$10 @ \$10.50; Car-Axles, \$24.50; Splice-Bars, \$21; Horseshoes, \$19; Locomotive Tires, \$17; Wrought Pipe, \$14; Leaf Steel, \$16; Coil Steel, \$15; Wrought Turnings, \$12.50 @ 13; Axle Turnings, \$13.50; Cast Machinery, \$12; Stove-Plates, \$9.50; Cast Borings, \$9; Wrought Borings, \$10.50; Mixed Country Scrap, \$15.

**Hardware.**—Jobbers are about as busy as they can well be. All kinds of goods are moving freely. Retail merchants have become convinced that prices of Hardware will be higher because raw material has so rapidly enhanced in value, and thinking that the present is a good time to buy they are sending in their orders. Collections are very good, considering that farmers have hardly begun to realize on their crops.

**Nails.**—Jobbers have advanced the price of Cut Steel Nails from stock to \$2.15 for small lots, with 5¢ off for mixed carloads and 15¢ less for carloads at mill. Another advance is expected soon, as manufacturers' prices are moving upward. Wire Nails they quote at \$2.45 in small lots, with 5¢ off for mixed carloads. Manufacturers' agents have recently taken very large orders for both Cut Steel and Wire Nails. On the former the best quotation now current is \$2 at mill on a 25¢ average. The demand now coming in is from the smaller jobbers, who hesitated about buying in anticipation of their wants when prices were at their lowest. Wire Nails are quoted at \$2.25 @ \$2.30 at mill, but there are very few sellers at the lower rate. Lots of 5000 to 10,000 kegs of Wire Nails have been sold at these figures in the past week.

**Barb-Wire.**—A heavy trade is in progress, and prices have begun to move upward, with a prospect of a very decided advance before January 1. Manufacturers and jobbers are alike quoting 2.90¢ for carloads of Painted and 3¢ for small lots, with the usual 60¢ @ 100 advance for Galvanized.

**Pig-Lead.**—Private sales are reported to have been made by various refiners. Concessions made in this market by one refiner reduced values to a 3.75¢ basis, sales footing up 600 tons. At the close of the week the market was firmer, and an advance was expected in the near future.

(By Telegraph.)

Chicago jobbers met to-day and advanced the price of Steel Nails to \$2.20, Wire Nails to \$2.50, with 5¢ off for carloads. This action is caused by higher rates named by manufacturers of 5¢ @ 10¢.

## Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., October 1, 1889.

**Pig-Iron.**—The market shows very little change since last week, although there is an undercurrent of strength, which seems likely to develop into higher

prices in course of a few days. Good brands are so scarce that many of them are practically out of the market, while the low-priced lots appear to have been taken up or withdrawn. The consequence is that buyers have very little choice but to take medium qualities at prices nominally quoted for the best brands, but which, as we have said, are mostly sold up, and therefore not available. Under these conditions it is highly probable that when makers of first-class Irons are ready to quote on new business, it will be at higher figures than those realized during the month just closed. It is true that several additional furnaces producing Iron of this character will be put in blast at an early date, but the outlook indicates a demand sufficient to take all that they can make, and probably at a slight advance on prices recently ruling. There is a great deal of inquiry from large consumers, and it is certain that requirements during the balance of the year will be very heavy. The offerings are light, and as stocks in consumers' yards are small an unusually heavy buying movement seems to be inevitable. Sales during the week have been on the basis of \$15.25 @ \$15.75, delivered at tide, for Gray Forge, \$16.50 @ \$17 for No. 2 Foundry and \$17.50 @ \$18.50 for No. 1. Brands that are specially preferred are readily taken at outside figures, and it is intimated that slight additions will be made to these quotations in case buyers insist on taking large lots. At the medium and inside figures it is a matter of opinion as to the quality. New brands especially have to be sold at comparatively low prices so as to secure a trial. Southern Irons are not offered here at present, although it is intimated that buyers for large lots could be found at about \$15 for Gray Forge and \$17 for No. 1.

**Spiegel.**—Bids of \$32 have been made for 20 %, but holders ask a little more, say \$33, c.i.f., duty paid. Ferromanganese has been sold during the week at prices varying from \$75 to \$80 for 80 %, but holders now ask a further advance, say \$82.50 @ \$85.

**Blooms.**—It is about as difficult to get deliveries of Steel Blooms and Billets as it is to decide what is a fair quotation. Those who have none to sell quote comparatively low prices, while those who can make deliveries quote according to the urgency of buyers' requirements. In a general way the following figures are believed to be a fair average of the market: \$32 @ \$33, delivered, for Nail Slabs; \$33 @ \$35 for Sheet or Tank; \$37.50 @ \$39 for Shell; \$40 @ \$42 for Flange, and \$42 @ \$43 for Fire-Box; Charcoal Blooms, \$52 @ \$54; Runout Anthracite, \$42.50 @ \$43.50; Scrap Blooms, \$32.50 @ \$33.50 @ "Bloom" ton of 2464 lb

**Muck-Bars.**—The demand has not been important of late and business is settling down to steady prices, say \$29.50 @ \$30, delivered, or \$28 @ \$29 at mill. Last sale reported was at \$30, Philadelphia, but a few Bars could be had to-day at a shade less money. But the offerings are not large, and a very slight increase in the demand would be likely to carry prices to higher figures than have yet been reached.

**Bar-Iron.**—The market has not shown much buoyancy of late, and in one or two instances we hear of orders being solicited at 1.85¢. But in most places mills have plenty of work and are not quoting less than 1.90¢ @ 1.95¢ for Best Refined Iron. Old Rail Iron has been offered at 1.70¢ @ 1.75¢ from some of the country mills, and some that is said to be strictly Refined Iron at 1.80¢, but buyers have not felt enough confidence in the quality to take hold of it. The demand has certainly fallen off, but it is thought to be only temporary, and, as leading mills have all the work they can handle for some time

to come, it makes very little difference, except to a few of the smaller mills, and these would soon be filled up on any moderate renewal of the demand.

**Skelp Iron.**—The demand has fallen off materially, although bids of 1.80¢ are made for Grooved, and 2¢ @ 2.10¢ for Sheared, but manufacturers ask about 1.85¢ @ 1.90¢ and 2.10¢ @ 2.15¢, and as high as 2.25¢ for Plates. Consumption continues on a large scale, but a good deal of stuff has yet to be delivered on old contracts, so that both sides can afford to wait developments. (Since writing the above we hear of sale of 1000 tons Grooved at 1.85¢).

**Plates.**—The demand is still somewhat in excess of the capacity of the mills to supply, so that it is a matter of extreme difficulty to place orders for prompt delivery. There is a great deal of work on hand, some having contracts that will employ them pretty well to the end of the year. Prices under these conditions are naturally very firm, with a probability of further advances, unless something unforeseen occurs to check the demand. Today's quotations average about as follows, say: 2.20¢ @ 2.25¢, delivered, for Ordinary Plates and Tank Plates; 2.25¢ @ 2.30¢ for Universal Plates; Shell, 2.5¢ @ 2.6¢; Flange, 3.25¢; Fire-Box, 3.75¢ @ 4¢; Steel Plates, Tank and Ship Plate, 2.35¢ @ 2.40¢; Shell, 2.6¢ @ 2.7¢; Flange, 2.9¢ @ 3¢; Fire-Box, 3½¢ @ 4¢.

**Structural Material.**—The mills are crowded with work, and although new business is not of much importance, the general position is entirely satisfactory. Consumption is heavy in all departments, and the amount of business in sight gives ample guarantee of the activity being maintained for a long time to come. Prices are firm, with an advancing tendency, although for the present quotations are about as follows: Bridge Plate, 2.25¢ @ 2.30¢, delivered; Angles, 2.20¢ @ 2.25¢; Tees, 2.6¢ @ 2.7¢; Beams and Channels, 2.8¢ for Iron or Steel, all delivered at Philadelphia or its equivalent.

**Sheet-Iron.**—The market is firm, and stocks both at mills and stores are very much reduced. Some of the low-priced sellers have advanced their quotations, but first-class makes may still be bought at the following quotations for carload lots:

Best Refined, Nos. 14 to 20.....	3¢
Best Refined, Nos. 21 to 24.....	3.20¢
Best Refined, Nos. 25 to 26.....	3.40¢
Best Refined, No. 27.....	3.50¢
Best Refined No. 28.....	3.60¢
Common, ¼¢ less than the above.	
Best Soft Steel, Nos. 14 to 20.....	3½¢
Best Soft Steel, Nos. 21 to 24.....	3½¢
Best Soft Steel, Nos. 25 to 26.....	3¾¢
Best Soft Steel, No. 27.....	4¢
Best Bloom Sheets, ¼¢ extra over the above prices.	
Best Bloom, Galvanized, discount.....	62½¢
Common, discount.....	65 ¢

**Steel Rails.**—Prices are again higher, \$31 at mill being a firm quotation for early deliveries. The advance in all kinds of material compels manufacturers to secure prices in proportion, and it begins to look now as though still higher figures would be quoted before long. The demand for Blooms and other specialties, along with the improved demand for Rails, is giving the mills employment to their fullest capacity, so that prospects are of the most hopeful character.

**Old Rails.**—Prices are largely a matter of location, and according to whether parties want to buy or sell. Probably \$25 would be paid at sea-board by any one needing Rails, and \$26 @ \$26.25 has been paid for lots delivered at mills in the interior. The offerings are small and erratic, and the heaviest holders are not naming prices at present, as they believe in very much higher figures than those now obtainable.

**Scrap-Iron.**—There is no change in prices, but there is no difficulty in finding

buyers at quoted rates, which are about as follows, say: \$22 @ \$22.50 for carload lots, delivered; or for choice, \$23; No. 2 do., \$15 @ \$16; Turnings, \$14 @ \$15; Old Steel Rails, \$16.50 @ \$17.50; Cast Scrap, \$15 @ \$16; do. Borings, \$9 @ \$10; Old Fish-Plates, \$25 @ \$26.

**Nails.**—Prices still remain at about \$1.90 for carload lots and \$2 for lots from store, but the indications point to a very decided advance before long. Cost of production is steadily advancing, and there is no reason why Nails should not take their place with other commodities upon which heavy advances have been made. An advance of at least 10 cents may be announced at any moment.

**Wrought-Iron Pipe.**—The demand is steady and satisfactory. There has been some disposition on the part of mills to restrict product on account of the expected advance. The indications are now that they will have all the orders they can attend to for several months to come. Discounts are as follows: Butt-Welded Black, 50 %; Lap-Welded Black, 62½ %; Butt-Welded Galvanized, 42½ %; Lap-Welded Galvanized, 50 %.

Mr. F. R. Phillips has removed his office from 407 Walnut street to 201 Walnut place, which is an admirable location, besides giving better office facilities. Buyers of specialties in his line would do well to give him a call.

## Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave. {  
PITTSBURGH, October 1, 1889. }

The Iron and Steel industries continue in an active condition and it is reasonably sure that this will continue for some time to come. It is probable that the demand for Wrought-Iron Pipe will decrease with winter weather, which will stop the laying of it in the ground, and this, of course, will reduce the demand for Pipe Iron, but against this there is an increasing demand for Rails, as well as all kinds of railway supplies. The inquiry for all kinds of Merchant Iron and Steel is also increasing, so that active trade in these great staples is assured for the coming winter at least.

The death of Capt. W. R. Jones, general manager of the Edgar Thomson Steel Works, is a hard blow, not only to Carnegie, Phipps & Co., but to the community as well. He was held in the highest esteem by all who enjoyed his friendship or acquaintance.

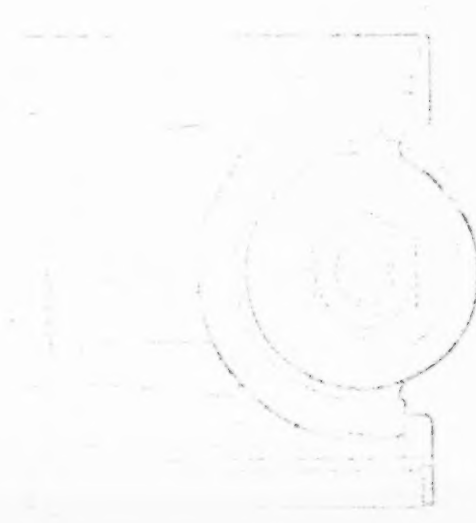
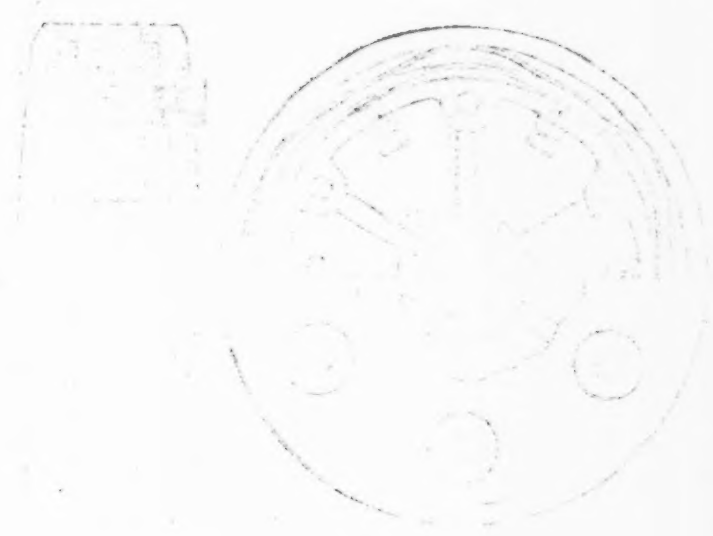
**Pig-Iron.**—The demand continues good, especially for future delivery, and the market is still tending upward. As compared with the lowest point Mill Irons have advanced \$2 @ \$2.25 per ton and Bessemer from \$2.25 to \$2.50, and, as already noted, the market is active and strong at the advance. Quotations may be fairly given as follows:

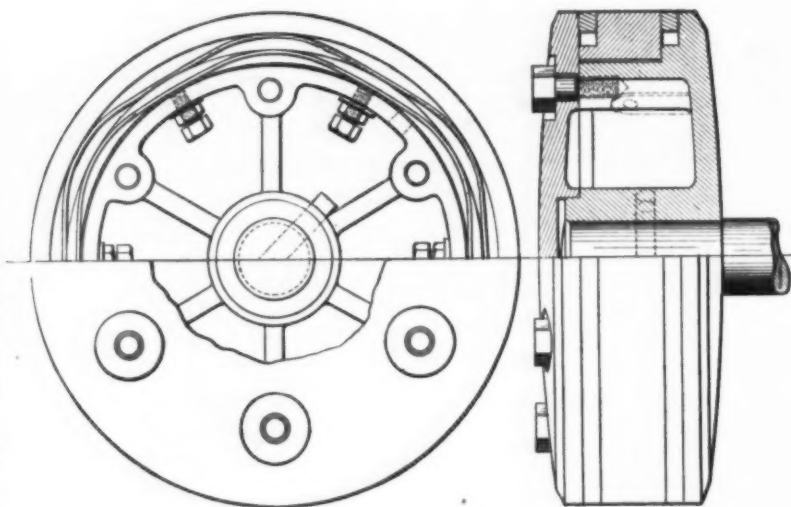
Neutral Gray Forge.....	\$15.75 @ \$16.00, cash.
All Ore Mill.....	16.50 @ 17.00, "
White and Mottled.....	14.00 @ 14.50, "
No. 1 Foundry.....	17.25 @ 17.50, "
No. 2 Foundry.....	16.25 @ 16.50, "
No. 1 Charcoal Foundry.....	24.00 @ 24.50, "
No. 2 Charcoal Foundry.....	21.50 @ 22.00, "
Cold Blast Charcoal.....	25.00 @ 26.00, "
Bessemer Iron.....	18.25 @ 18.50, "

**Muck-Bar.**—There is considerable inquiry, especially for future delivery, and the market is firm, but so far as we are able to learn there have been no sales above \$28.50, cash, although some makers are refusing to contract for future delivery under \$29, while others are demanding \$30. It is claimed that at \$16 for Pig-Iron Muck Bar should bring \$30.

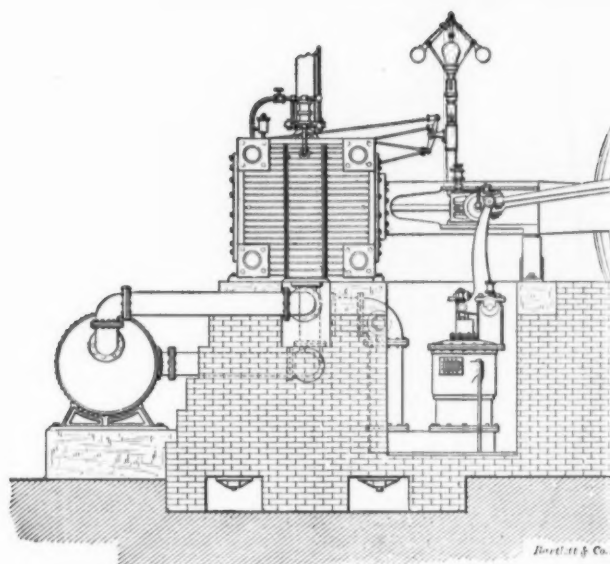
**Spiegel.**—Continues to advance, a sale of 100 tons of 20 % having been reported at \$39, cash. Ferromanganese is also on the upward turn, a sale of 200 tons being



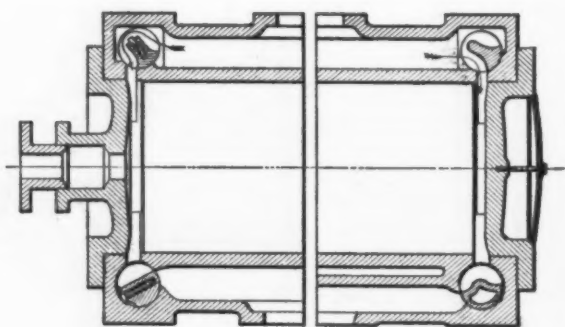




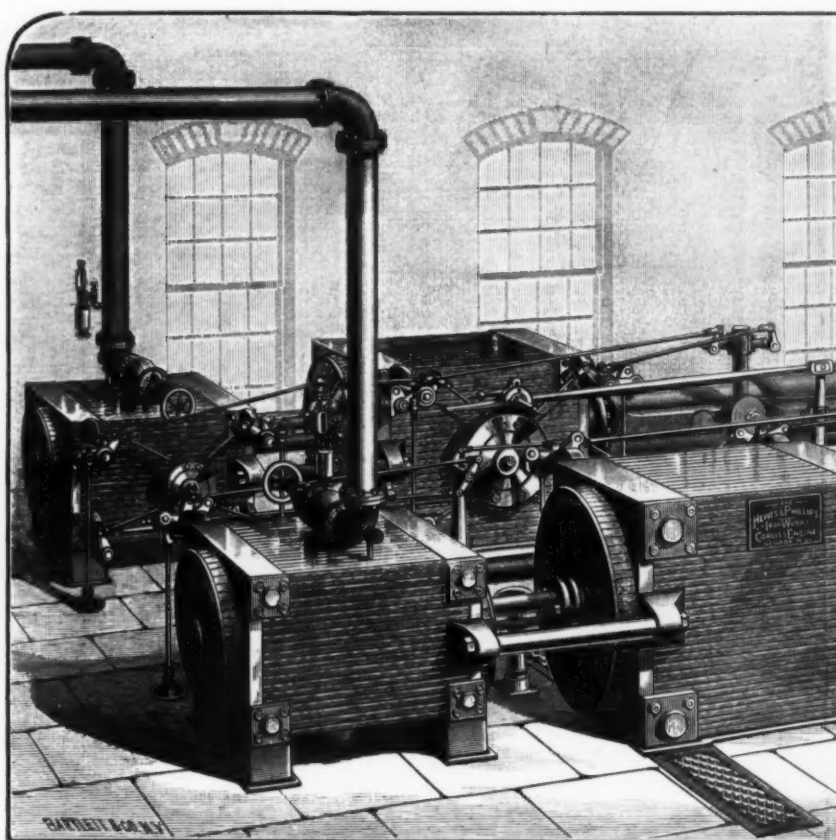
THE PISTON.



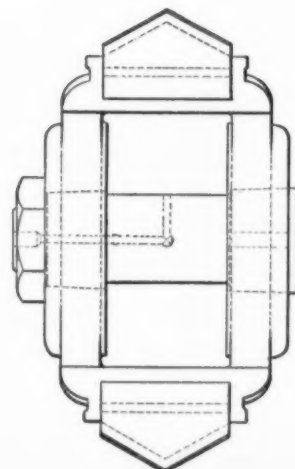
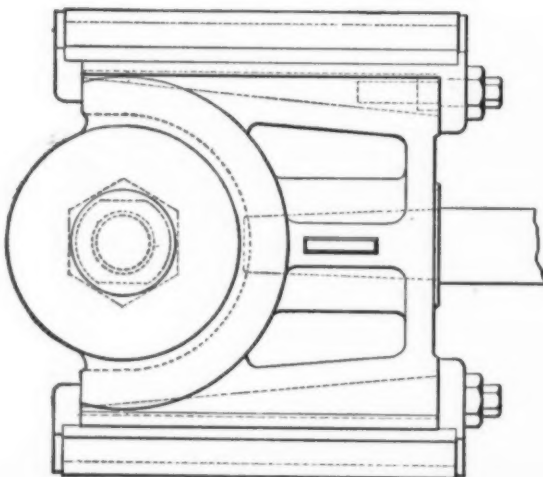
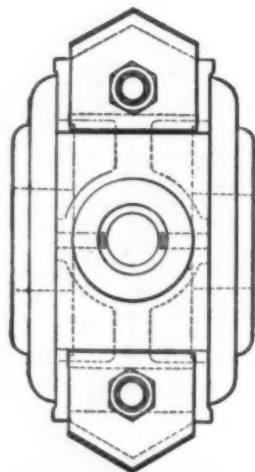
CROSS COMPOUND—SIDE ELEVATION.



Other Builders. Hewes & Phillips' Design.  
THE CYLINDER.

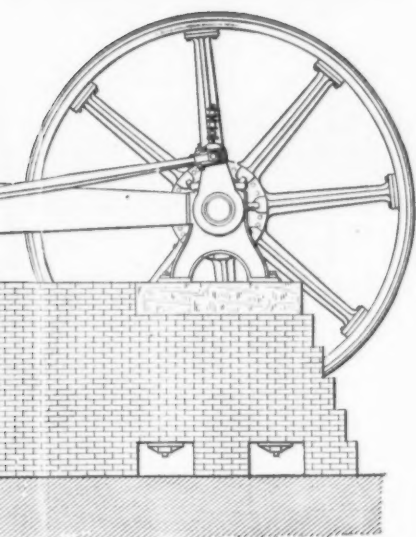


PAIR OF TANDEM COMPOUND.



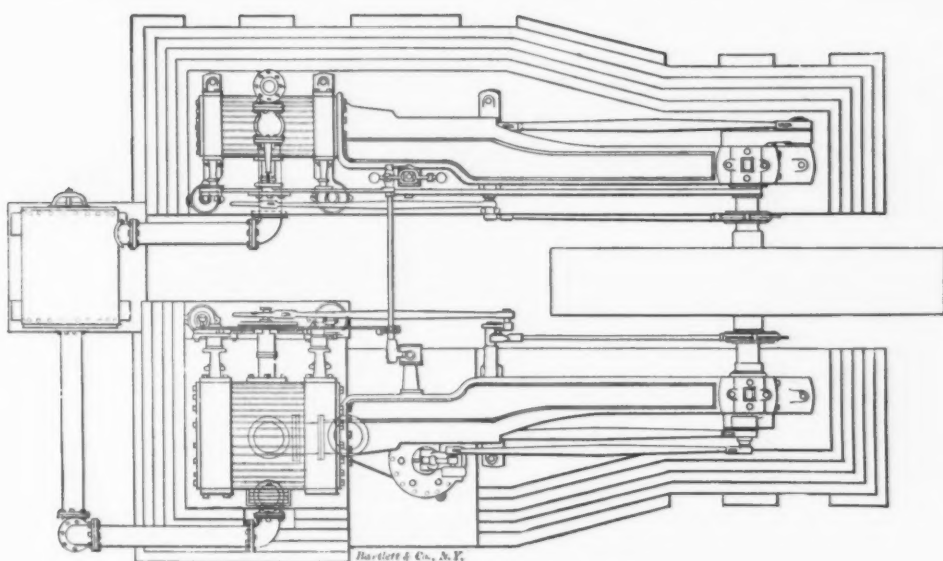
THE CROSS-HEAD.





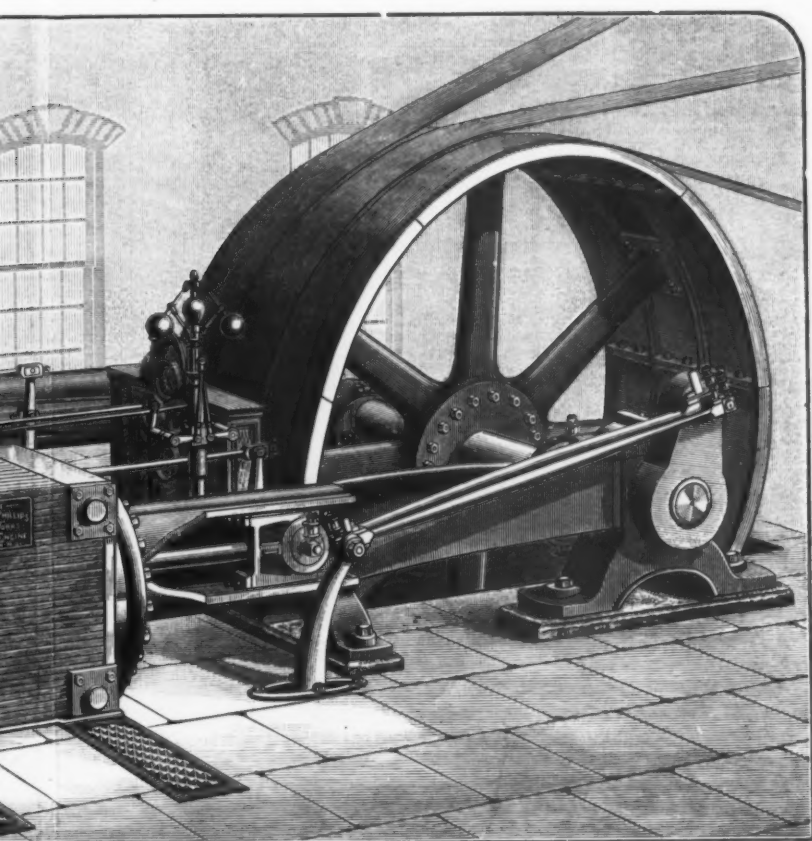
et & Co., N.Y.

ELEVATION.

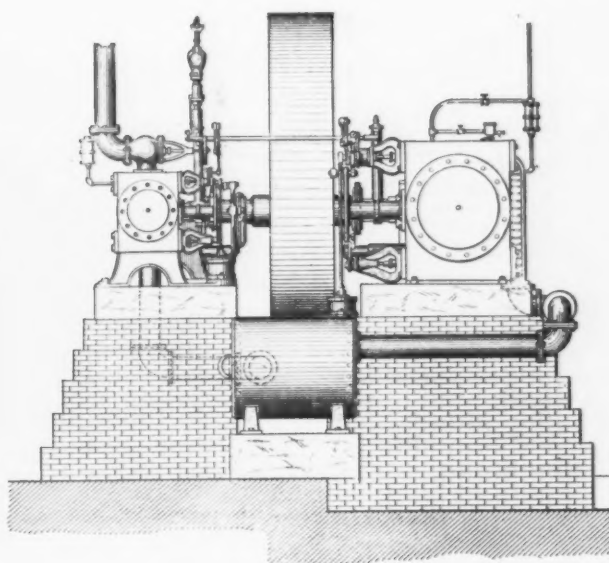


Hartlett & Co., N.Y.

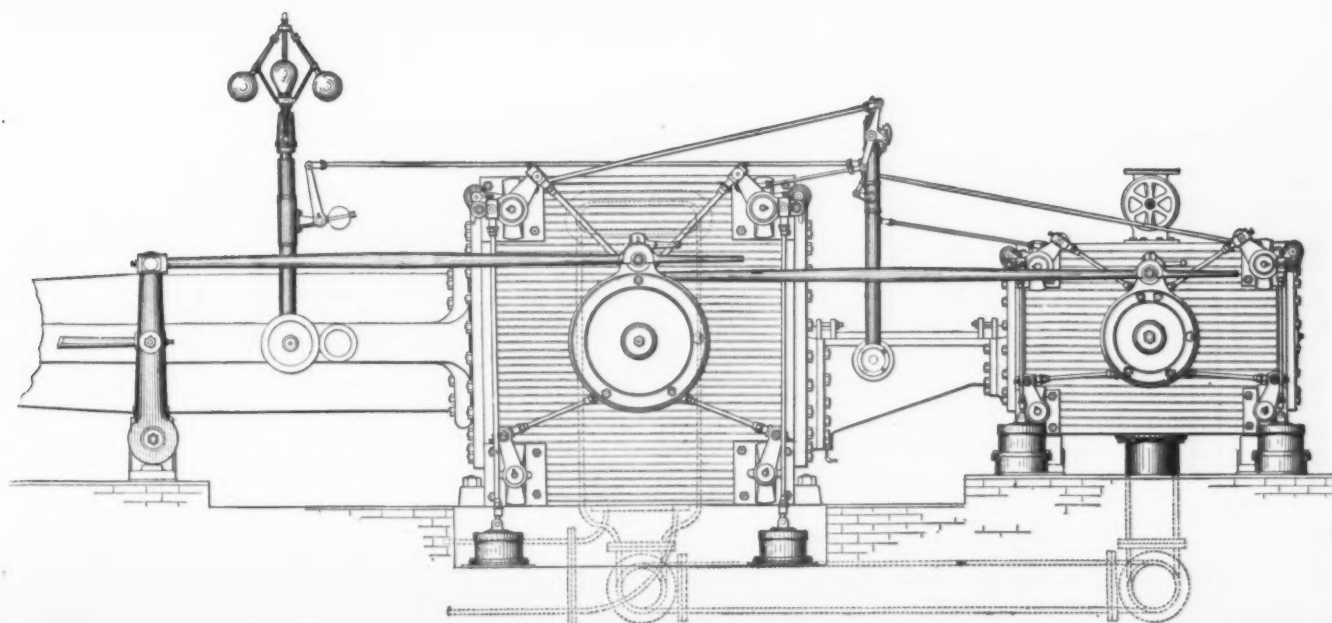
CROSS COMPOUND-PLAN.



COMPOUND ENGINES.



CROSS COMPOUND-END ELEVATION.



TANDEM COMPOUND VALVE-GEAR.

CORLISS STEAM ENGINES.





reported at \$77.40 for 80 %, showing an advance of about \$10  $\frac{1}{2}$  ton within the past four or five weeks.

**Manufactured Iron.**—Demand continues good, mills are all about as busy as they can be, many of them unable to keep up with their orders, and prices are firm and advancing. Bars may now be quoted at 1.80¢ @ 1.85¢; Tank and Plate, 2.30¢ @ 2.35¢; No. 24 Sheet, 2.85¢ @ 2.90¢; Structural Iron, 2.15¢ @ 2.20¢ for Angles; Tees, 2.60¢ @ 2.65¢; Beams and Channels, 2.80¢ @ 2.85¢; Skelp Iron is firm at 1.80¢ @ 1.90¢ for Grooved and 2 10¢ @ 2.20¢ for Sheared. There is a probability that the demand for Skelp Iron will drop off with the advent of the winter season.

**Nails.**—The market for Cut Nails continues very firm, and in view of the further advance in the cost of Nail-Plate, it is evident that prices will have to go still higher. It is claimed by makers that present prices do not cover actual cost of production, that the Nails being cut and packed in kegs are not bringing enough to pay for the cost of Nail-Plate. We quote \$2 @ \$2.10, 60 days, 2 % off for cash. So far as we can learn there have been no sales made above \$2, but an advance to \$2.10 is almost a certainty within a few days.

**Wrought-Iron Pipe.**—The activity noted for several months past continues, but it is expected that new business will fall off somewhat with the advent of the winter season as it always does; however, the Pipe-mills are all oversold, and some of them have enough contracts on their books now to absorb their production until well toward the close of the present year, if not longer. This has been an unusually good year for the Pipe manufacturers, as in addition to a big trade they have been able to realize fairly remunerative prices, the result largely of their excellent organization. Prices firm at the association rates. Discount on Black Butt-Welded, Pipe, 50 %; on Galvanized do., 42½ %; Black Lap-Welded, 62½ %; on Galvanized do., 50 %; Boiler-Tubes, 1½-inch and smaller, 50 %; 2-inch and larger, 55 % off; Casing, 5½-inch, 60 % off.

**Old Rails.**—There is considerable inquiry, and prices are still tending upward; we can report a sale of 500 tons at \$26.35, but at the prices demanded at some sources of supply they could not be laid down here under \$27 @ \$28, which buyers here are not yet prepared to pay. A consumer reports having bought a lot of 1500 tons ten days ago at \$25.75, which was below the market at the time. There is a lot in storage here that cost \$28 a number of years ago; by the time interest and cost of storage is added they will cost the owner considerably more. Old Steel Rails are also firmer and advancing; we now quote at \$19.50 for short and \$21 @ \$21.50 for long pieces.

**Steel Rails.**—The market for new Steel Rails continues strong, and within the past week there has been an advance of 50¢ @ \$1  $\frac{1}{2}$  ton. We now quote at \$32, a sale having been reported at that price, and we now have \$33 talked of. The trouble with all the mills is that they are well sold ahead and not in position to make additional contracts, and many of these contracts were made at prices from \$3 to \$5  $\frac{1}{2}$  ton below those now ruling.

**Billets, Blooms, &c.**—The demand for Billets keeps up, and as the mills are nearly all sold ahead, brokers report that it is very difficult to place an order for near-by delivery. We are reported a sale at \$32, which appears to be the ruling price. Nail Slabs are quoted at \$31 @ \$31.50. Sale of 1000 tons Bloom Ends at \$21.

**Railway-Track Supplies.**—There is considerable inquiry, and prices for everything in this line are tending upward.

Spikes may be quoted at 2.10¢ @ 2.15¢, 30 days; Splice Bars at 1.85¢ @ 1.90¢; Track Bolts at \$2.75 @ \$2.80 with Square and \$2.85 @ \$2.90 with Hexagon Nuts

**Old Material.**—There is an increasing demand and prices are strong. No. 1 Wrought (Railway Shop) Scrap, \$21, net, ton; Wrought Turnings, \$13.50 @ \$14; Car Axles, \$25 @ \$26; Cast Scrap, \$15 @ \$15.50, gross ton; Old Car-Wheels, \$18 @ \$18.50.

## Detroit.

WILLIAM F. JARVIS & Co., under date of September 30, 1889, say: No important change can be noted in the market during the past week, although it must be said that in certain spots it was found to be a trifle weak. However, this refers not to general trade, but to particularly large orders for unusual grades. October 1st can be said to be even better than September 1st. The market has been more carefully investigated. The big diminution in surplus stocks has caused the feeling of strength to become more generally believed and fully accepted by nearly all buyers. At the same time, there are some buyers who claim that the demand for the past 60 days has been so much in excess of what the demand probably will be from now to the close of the year that furnaces will begin to accumulate, and that prices during the dull period which usually follows the opening of each year will have a tendency to fall, rather than go higher. Lake Superior Charcoal has been less active during the past week, although stray lots are being sought for by certain buyers to complete their mixtures. Old Rails have been in considerable demand at strong figures. Quotation on Old Wheels given below is nominal. With a continued strong market, but less active, we should place quotations as follows:

Lake Superior Charcoal, all numbers	\$19.25 @ \$19.75
Lake Superior Coke, all ore	18.50 @ 19.50
Lake Superior Coke, cinder mixed	17.50 @ 18.50
Standard Ohio Black band	18.00 @ 18.50
Southern No. 1	17.00 @ 17.50
Southern Gray Forge	15.50 @ 16.00
Southern Silvery	16.50 @ 17.00
Jackson County (Ohio) Silvery	18.00 @ 18.50
Old Wheels	18.50 @ 19.50
Old Iron Rails	25.25 @ 25.50

## Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, September 30, 1889.

**Pig-Iron.**—There has been little change in the leading features of the local market for Pig-Iron during the past week. There have been a larger number of small sales, but few large contracts placed. This has been due more to the higher prices asked for large amounts than to a lack of demand for such amounts. Small buyers have more fully recognized the strength of the market and have bought more freely while the Iron has been obtainable. Gray Forge and No. 3 Foundry have been most in demand, but other grades have not been neglected. An advance of 25¢ has been obtained on both the above grades and a further advance of 25¢ is now asked. Mottled Iron has been scarce, strong and higher. Virginia and Pennsylvania brands have shared to a greater extent in sales made recently. There has been less doing in Car-Wheel Iron, but there is a fair inquiry, while Southern make is held 50¢  $\frac{1}{2}$  ton higher. Among the sales during the week were 3000 tons Gray Forge at \$14.25, 500 tons Mottled at \$13.75, 2000 tons No. 3 Foundry at \$14.75, 200 tons No. 2 do. at \$15.25 and 500 tons No. 1 do. at \$15.75. Smaller amounts of No. 1 Foundry have also sold at \$15.50 and special brands as high as \$16. The following are approxi-

mate prices current here at the close for cash, f.o.b.:

### Foundry.

Southern Coke, No. 1	\$15.75 @ \$16.00
Southern Coke, No. 2	15.00 @ 15.25
Southern Coke, No. 3	14.50 @ 14.75
Ohio Soft Stone Coal, No. 1	16.00 @ 16.75
Ohio Soft Stone Coal, No. 2	15.00 @ 15.75
Maboning and Shenango Valley	16.00 @ 16.75
Hanging Rock Charcoal, No. 1	20.00 @ 22.00
Hanging Rock Charcoal, No. 2	19.00 @ 21.50
Tennessee and Alabama Charcoal, No. 1	17.50 @ 18.50
Tennessee and Alabama Charcoal, No. 2	16.50 @ 17.50

### Forge.

Gray Forge	14.25 @ 14.50
Mottled Neutral Coke	13.50 @ 13.75

### Car-Wheel and Malleable Irons.

Southern Car-Wheel	23.00 @ 24.00
Hanging Rock, Cold Blast	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable	20.00 @ 20.50

**Manufactured Iron.**—The market has continued strong, with a fair demand for Bar, Plate, Sheet, Bolts, Nuts, &c., and full prices are readily realized.

**Nails.**—There has been an active demand and prices have advanced 10¢ @ 15¢. Iron and Steel Nails, 12d to 40d, sell at \$1.95 @ \$2  $\frac{1}{2}$  keg, with 10¢ rebate in carload lots, at the mills. Steel Wire Nails sell at \$2.35 @ \$2.40 for 60d.

**Old Material.**—There has been an active demand and a strong market for Old Rails at \$24, but the offerings have been small. Old Wheels have been quiet, but firm, at \$19, spot cash.

## St. Louis.

Office of *The Iron Age*, 214 N. Sixth st., St. LOUIS, September 30, 1889.

**Pig-Iron.**—The past week has not been characterized by any special features. The demand, which has been large for some weeks past, is still maintained, and more Iron could be sold if a furnace were found looking for trade, but they are mostly filled up and not inclined to tie up their product too far ahead. Southern Charcoal Irons are called for, and some good-sized lots were placed at current quotations. The demand for Ohio Softeners is improving, and bids fair to continue for some time, and as the stock on hand is only moderately large any continued demand is likely to result in higher prices. Summing up the general situation, we would say the market is in better condition today than it has been for months, and while prices have advanced fully \$1 in the past 60 days the advance has been gradual, and any movement tending toward speculation has not as yet appeared. While this state of affairs exists it is only reasonable to suppose the tendency of prices will be upward. For ordinary-sized lots we quote as follows for cash, f.o.b. St. Louis:

Southern Coke, No. 1 Foundry	\$16.00 @ \$16.50
Southern Coke, No. 2 Foundry	15.25 @ 15.75
Southern Coke, No. 3 Foundry	14.75 @ 15.00
Gray Forge	14.25 @ 14.50
Ohio Softeners	17.00 @ 19.00
Lake Superior Charcoal	20.00 @ 21.50

### Missouri.

Charcoal Foundry, No. 1	16.50 @ 17.00
Charcoal Foundry, No. 2	15.50 @ 16.00

### Tennessee.

Charcoal Foundry, No. 1	18.00 @ 18.50
Charcoal Foundry, No. 2	17.00 @ 17.50
Connellsville Coke, f.o.b. East St. Louis, \$5; St. Louis, \$5.15.	

**Bar-Iron.**—Mills are not looking for business, and would be better satisfied if they were let alone for a few weeks, to enable them to catch up with their orders, but this seems out of the question, as the demand continues to be unusually heavy and jobbers are complaining of want of stock to fill their orders. Prices are strong and are being firmly maintained, and the absence of those from the market who are always willing to cut prices is

freely commented on. Mills quote from 1.85¢ to 1.90¢, and lots from store command 2¢.

**Barb-Wire.**—Business in this department continues to improve and mills are kept busily employed. The recent advance in prices which was made on September 5 has proved insufficient to cover the increased cost of Steel Billets, Wire Rods, &c., and a further advance was made, which will go into effect October 1, and from advices received from the mills these figures are liable to be withdrawn at any moment and still higher figures substituted. The following prices constitute the new list, and are quoted as follows, f.o.b. St. Louis, 60 days, or 2 % off for cash 10 days: Painted, in small lots, 3¢; Galvanized, 3.60¢; carload lots, Painted, 2.90¢; Galvanized, 3.50¢.

## Louisville.

LOUISVILLE, KY., September 30, 1889.

The market has been quiet during the past week, with few transactions. Buyers for delivery this year have largely contracted for what Iron they will need, and as furnaces are unwilling to sell freely for delivery extending over more than 90 days, but few sales have been made. There has been no disposition to shade, and buying elsewhere has caused furnaces to hold prices of last week very firm. It is thought that owing to increased business of railroad companies buying on their part will be more free than in the past, and that the placing of large orders by them will cause a further increase in the price of Iron. Railroad companies throughout the South report the amount of freight offered as unusual, and frequently there is a demand for 300 to 400 cars a day in excess of the supply. A careful canvass of Southern furnaces shows that for delivery during the next 60 days there is a scarcity of Mill Irons.

Southern Coke, No. 1 Foundry (new classification).....	\$15.00 @ \$15.50
Southern Coke, No. 2 Foundry (new classification).....	14.50 @ 15.00
Southern Coke, No. 3 Foundry (new classification).....	13.75 @ 14.25
Gray Forge.....	13.25 @ 13.75
White and Mottled, different grades.....	12.75 @ 13.25
Silver Gray, different grades.....	13.25 @ 13.75
Southern Charcoal, No. 1 Foundry.....	16.50 @ 17.00
Southern Charcoal, No. 1 Mill.....	15.00 @ 15.50
Southern Car-Wheel, standard brands.....	22.00 @ 23.00
Southern Car-Wheel, other brands.....	18.25 @ 19.75
Hanging Rock Coke, No. 1 Foundry.....	15.75 @ 16.25
Hanging Rock Charcoal, No. 1 Foundry.....	19.75 @ 21.25
Hanging Rock, Cold Blast.....	21.00 @ 23.00

## Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, September 30, 1889.

**Pig-Iron.**—The market is quiet and conservative, yet there appears a very great degree of firmness, that would indicate a forward movement in prices. This has been expected for the past few weeks, but not realized to the extent that was anticipated. The upward movements that have been made in prices have been very gradual, which has produced a very satisfactory feeling among the producers, who have endeavored to avoid all sudden changes in prices.

**Miscellaneous.**—The past week has been big with developments connected with the Iron-producing business of the South and especially of this district. Negotiations that have been pending for some months have matured by the purchase of 16,000 acres of Coal and Iron lands about 15 miles south of this place by a syndicate of Eastern capitalists. The price paid was \$214,000, of which \$50,000 was paid down, the balance in two or three months. They will put an additional sum of \$600,000 in the building of a town and development of the property, and it is understood that they will place

\$5,000,000 at the disposal of those whose interests will become identified with them. Another large deal is in the consolidation of several charcoal plants and the Roane Iron Company, of this city. From information received it is the intention of the parties (who are among the most notable Iron-workers of the United States) to erect an extensive Steel plant in this city.

## New York.

Office of *The Iron Age*, 65 and 68 Duane street, NEW YORK, October 2, 1889.

**American Pig.**—There has been no particular change in the market the past week. The daily sales have amounted to considerable in the aggregate, but deliveries on old contracts still figure most prominently in the movement of supplies into consumers' hands. Furnace agents are offering reservedly, as leading brands of both Northern and Southern makes continue to be well sold up. The demand has differed in no remarkable degree from that experienced during the previous week; many of the largest consumers appear to have under contract about all the Iron they are likely to need the balance of the year and manifest no inclination to buy further ahead, for the present at least. Others purchase only as immediate wants necessitate. However, the business for the week makes a very good showing. Sales were reported of 4000 tons Pennsylvania and State brands and 2500 tons Southern. The Thomas Company report deliveries averaging 4000 tons per week the past six weeks, these not only taking the current output, but more or less stock from furnace banks as well. Prices remain steady, as follows: No. 1 Anthracite Foundry, at tide-water, \$17 @ \$18; No. 2, \$16 @ \$17; Gray Forge, \$15 @ \$15.75; Southern No. 1 Coke Foundry, delivered at New York, \$16.75 @ \$17; No. 2, \$15.75 @ \$16; No. 3, \$15.25 @ \$15.75.

**Scotch Pig.**—Business in this line is small, owing to the very high cost of all brands. Sales have been made at \$23.50 for Summerlee and Coltness, while Langloan and Shotts are held as high. For Dalmellington, \$21 @ \$21.50 is now quoted.

**Spiegeleisen and Ferromanganese.**—Foreign 20 % Spiegeleisen is quoted nominally at \$32 @ \$33, with very little offered for delivery this year. Several thousand tons have been sold. About 2000 tons American 10 @ 12 % were sold recently at \$27 at works, Bethlehem, and \$28 @ \$29 is now quoted. Ferromanganese has been sold at an advance on the highest price quoted in last week's report. Some 400 to 500 tons went at \$73 @ \$75, the latter price being paid for a lot of 100 tons. A similar quantity was subsequently reported at \$76, and even as high as \$78 was said to have been paid.

**Steel Rails.**—The market has continued very firm. Rails for delivery the next three months seem difficult to obtain at any concession on quoted prices, so closely is the output of all the mills sold up. Eastern agents quote \$29, at works, as bottom price for heavy sections and report quite numerous inquiries, including several for large lots for 1890 delivery. Reports from Pittsburgh and Chicago indicate that prices are relatively as high there and the demand as good in those sections as in this quarter. One of the trunk-line railroad companies has purchased 5000 tons at \$29 at works, Scranton, Pa., with the option of taking a further 5000 tons at the same price. A Southern order for 8000 tons has been placed at \$29 at Eastern mill and another for a similar quantity, winter delivery, on special conditions, making the cost to the buyer considerably above the cash market price. Besides these there have been sales of 6000 tons, private terms, and 2000 tons to the New York and New

Haven at \$29, at works. Light sections are selling at prices on the basis of \$30, at works, for heavy Rails.

**Billets and Slabs.**—There has been no abatement in the demand for these. Large sales latterly have taken up so much of the output for the balance of the year that it has been difficult to purchase stock for prompt or near future delivery on bids showing 50¢ @ \$1 advance. Inquiries for foreign stock meet with the response that it is next to impossible to obtain anything for this year's delivery even at the high prices quoted in the European markets. Eastern mills are getting \$30 @ \$30.50, and \$32 @ \$33 was said to have been paid in Pittsburgh.

**Old Rails.**—A lot of 800 tons Tees has been offered at \$24, ex-store, and \$24.50 on cars at Jersey City. Another lot, very heavy section, was offered very recently at \$25 on cars. Both lots remain unsold. The best bids from consumers do not appear to be above \$24 on cars. It was reported, however, that 2000 to 3000 tons foreign have been sold, future shipment, at \$25, New York and Philadelphia delivery.

**Scrap-Iron.**—For Yard Scrap the demand has been moderate, and \$21 is still the best price for No. 1 Wrought, f.o.b., cars. About 150 tons were sold on line of railroad convenient to buyers' works at \$21.50.

Warren, Wood & Co., 115 Broadway, have been appointed sole agents for the sale of the Jenifer, Ala., Car-Wheel Iron. The furnace is now owned by the Noble Brothers, who are crushing and thoroughly washing their Ores in the endeavor to make a high-grade Iron.

## Metal Market.

**Copper.**—Since our last week's report spot Copper remained steady in London at £43, futures improving from £41. 15/ to £42; sales, 865 tons. Our own market has remained dull and featureless at 11¢ Lake, 10½¢ for Electrolytic, Arizona and Montana and 10¢ casting brands. At these figures consumers are buying to a very moderate extent merely for the filling of current requirements, beyond which they do not feel disposed to go in view of the unsettled, demoralized state of affairs that prevails in everything relating to this metal. From January 1 to September 16 the import of American Copper into Liverpool and Swansea amounted to 20,921 tons Fine, against 18,991 same time last year and 7881 in 1887. Spain exported during the first seven months 529,498 tons of Pyrites, against 494,348 in 1888 and 470,230 in 1887, and of Precipitate 16,819, against 15,745 and 16,409. The visible supply in England and France on October 1 was 105,750 tons, against 106,750 on September 1 and 90,705 October 1, 1888.

**Tin.**—During the week under review London gave way from £89. 15/ to £89. 5/ on the spot and futures from £90. 10/ to £90, sales summing up 1040 tons. In this market the premium on spot has gradually vanished, but the position of the metal remains healthy, the stock on the 1st inst. not exceeding 350 tons, while the amount afloat is 2200 tons, which is not large at this the most active season of the year. Messrs. Gillilan, Wood & Co., Singapore, August 21, remark that large arrivals are looked for in the near future at that point. Following are particulars of the shipments from the Straits Settlements during the first seven months: 1889, 82,378 piculs; 1888, 16,520; 1887, 46,858; 1886, 40,706; 1885, 16,471, and 1884, 37,408; in other words, at no time did the Straits ship so much this way, and as the visible supply, as shown above, does not exceed 2550 tons, American consumption must have increased



in a manner altogether unprecedented, which speaks well for the metal as regards the future. Meanwhile sales here were restricted to 110 tons, spot, at 21½¢ down to 20.40¢, and 20 tons prompt shipment at 20¢. Spot closes to-day at 20½¢. The visible supply in Europe and America October 1 was 13,004 tons, against 13,392 tons on September 1 and 11,451 on October 1, 1888. At the Metal Exchange in the forenoon 60 tons November Tin were sold at 19.90¢ and 25 first half of October at 20.10¢. **Tin-Plates.**—There has been a fair demand during the week, causing an advance in prices, the demand chiefly running on Cokes. The English market meanwhile still maintains its strength, although the demand for futures is not what it should be. We quote at the close, per box: Siemens-Martin Steel, Charcoal finish, \$5 @ \$5.50; Coke finish, \$4.70 @ \$4.75; Terns, \$4.10 @ \$4.30; Coke Tins, Penlan grade, \$4.35; J. B. grade, \$4.40, and Wasters \$4.15 @ \$4.20.

**Lead.**—This has been a very quiet, dull market, sales not exceeding 300 tons in the open market at 3.85¢ @ 3.95¢—the bulk at 3.90¢. St. Louis and Chicago have been quiet at 3.75¢ and 3.80¢ respectively. The closing quotation at New York to-day is 3.90¢. During the first seven months the export of Pig-Lead from Spain was 74,880 tons, as compared with 73,092 same time last year, and 77,037 in 1887.

**Spelter.**—Common Domestic has been excessively dull on the spot, there being a total absence of inquiry and, in fact, nothing doing, so that it can be quoted only nominally 5.10¢, while in the West it is strong at 4.85¢ @ 4.90¢. Silesian is nominally worth 6½¢. Spanish exportation of Calamine during the first seven months amounted to 15,925 tons, against 19,770 in 1888 and 19,849 in 1887.

**Antimony.**—Remains moderately active and strong at 19½¢ @ 19¼¢ Cookson and 17½¢ Hallett.

#### New York Metal Exchange.

The following sales are reported:

THURSDAY, September 26.	
16 tons Tin, November.....	4.00¢
48 tons Tin, November.....	3.97½¢
16 tons Lead, December.....	4.00¢
10 tons Lead, delivery October 1.....	3.95¢
FRIDAY, September 27.	
10 tons Tin, spot.....	21.25¢
SATURDAY, September 28.	
16 tons Lead, spot.....	3.95¢
50 tons Tin, spot.....	20.40¢
50 tons Tin, spot.....	20.45¢
TUESDAY, October 1.	
20 tons Tin, prompt shipment.....	20.00¢
WEDNESDAY, October 2.	
110 tons Tin, November.....	19.90¢
25 tons Tin, October, first half.....	20.10¢
25 tons Tin, December.....	19.90¢

#### Coal Market.

The Anthracite Coal trade is slightly improved with the advent of cooler weather and prices are firmer. But as yet consumers evince no general disposition to provide for future wants, being well aware that Coal is in good supply and that production could be enormously enhanced at short notice if occasion required. Stocks at shipping ports slightly increased during August, despite restriction at the mines. Prices for October remain as before and in a general way may be quoted about \$4 @ \$4.20 alongside for Stove and other sizes at a proportionate reduction from the regular schedule. It is stated that the Reading Company have been unable to fill some of their orders promptly for want of vessels of the desired size, and the Lehigh Coal and Navigation Company have disposed of all the coal they have mined thus far this year at satisfactory prices. At Scranton the Coal

officials predict that there will be little idle time after November 1 until early spring. The Board of Trade at Scranton are endeavoring to obtain cheaper transportation by the railroads for the smaller sizes of Anthracite, in order to check the encroachments of Bituminous traders within their domain.

Bituminous Coal finds a ready market, especially since transportation has been more or less interrupted by storms. Pool prices are quoted—viz., \$3.50 alongside, subject to discount. Cumberland reports for the week ending September 14 63,000 tons; Clearfield, 65,500 tons; Pocahontas, 35,000 tons.

Respecting new sources of Coal supply the Roanoke Times says: "The experiments made with samples of Gas Coal recently sent to New York from veins tributary to the Clinch Valley division of the Norfolk and Western Railroad, in Southwest Virginia, establish the fact that they will command a share of the patronage now enjoyed by the Pennsylvania, Westmoreland and Youghiogheny Coals in all the Eastern markets. They are claimed to equal in value the best Coals from the districts named."

#### Imports.

##### Hardware, Machinery, &c.

Boulton, Bliss & Dallett, Mach'y, case, 1  
Field, Alfred & Co., Chains, eks., 27  
Graef Cutlery Co., Cutlery, cs., 6  
Henderson Bros., Mach'y, pkgs., 3  
Knauth, Nachod & Co., Mach'y, cs., 24  
Matthiessen, F. O. & Wiechers, Mach'y, pkgs., 32  
Merchants Despatch Co., Hdw., case, 1  
Morris, L. W. & Son, Steel Castings, pkgs., 105  
Newton & Shipman, Files, eks., 4  
Rotterdam S.S. Co., Arms, cs., 12  
Safety Car Heating & L. Co., Iron Gas Boilers, pkgs., 25  
Order: Hdw., eks., 12; ditto, cs., 3; Mach'y, cs., 12

#### Financial.

The financial feature is uppermost this week, owing to active money and the engagement of \$500,000 for export, together with a further decrease in the bank returns, but it is noted that in banking circles there is no apprehension of difficulty from the sources named. The specie shipment is a special transaction, made at a material loss and at present without explanation. Accounts respecting general trade are for the most part of a cheerful tenor. In New York bad weather and the Hebrew holiday had a restrictive influence. Orders by mail are of fair proportions. Among dry goods jobbers there is less activity, but stocks are low and prices well maintained. The continued free shipment of currency to the interior, fully up to the usual amount for this season, indicates a demand for funds for crop movements and general business purposes, but a change in this respect will be looked for in a few weeks. Prices of wheat are below the average for ten years past, and in the British grain market the average has fallen 2/9 below the average of September, 1888. Exporters are buying rather more freely, chiefly for Brazil. Corn was sold on an October option at 39½¢. This is the lowest price on any crop in many years. Spot cotton was ½¢ lower, the primary cause being heavy port receipts and a slack market. Rio coffee on the spot is firmer. Raw sugars declined ½¢ and refined ¼¢ @ ½¢. Provisions dull and weak. Ocean freight room is wanted for cotton and provisions at full rates. Millers have taken all the room available for the next three weeks for flour sold direct to foreign markets. East-bound shipments of freight from Chicago, though improving, are not quite equal to those of last year, owing to increased charges. The Iowa Crop Bureau makes the condition of the corn crop 102½; total yield, 336,000,000 bushels, 50,000,000 bushels over last

year. The Minnesota State Statistician reports that the entire wheat yield is put at 45,500,000 bushels; the oat crop at 48,250,000 bushels, the largest average ever raised; the corn crop, 22,115,000, the heaviest ever produced. The cotton crop of this year is reported at 6,935,000 bales, and in weight is said to exceed that of last year by 30,000,000 pounds.

The Stock Exchange has listed pig-iron warrants issued by the American Pig Iron Storage Warrant Company under rules that have been formulated by a committee of the Stock Exchange. The market was active on Friday, with Atchison and Sugar Trust the principal features, but a raid on the latter unsettled the entire list. On Saturday there was more excitement in sugar and a sharp decline in Atchison, Topeka and Santa Fé, with an irregular movement on Monday, but there was improvement at the close. This week a decision is expected from the General Term in the appeal case against the North River Sugar Refinery. On Tuesday stocks were fairly active and ended with a slight fractional decline. Money loaned as high as 18%. Atchinson, Topeka and Santa Fé was favorably affected by the announcement that the interest due, amounting to about \$913,000, would be paid. The other stocks were strong.

Government bonds were quoted as follows:

U. S. 4½s, 1891, registered.....	105½
U. S. 4½s, 1891, coupon.....	105½
U. S. 4s, 1907, registered.....	127½
U. S. 4s, 1907, coupon.....	127
U. S. currency 6s.....	118

Money was more active, loaning as high as 10%, partly due to the low bank reserves, but more to a sharp break in Sugar Trust, which touched 87, against 104 a week ago. Banks and trust companies marked up their loans to 6%, and time contracts to 6%, three and six months, the advance in the Bank of England rate to 5% and dearer discounts at all the European centers apparently convincing borrowers that no gold could be obtained from Europe this year. Commercial paper continues of slow sale. Rates are 5½% for 60 to 90 days indorsed bills receivable, and 6½ to 7½ for good single names. The bank return for Saturday showed a decrease of \$1,043,650 in surplus reserve, bringing this item down to \$935,750, the lowest of the year. Loans were contracted \$290,000. The combined loans of the Clearing House banks last Saturday reached the enormous sum of \$409,602,300, more than \$18,000,000 in excess of last year, and almost the largest total ever reached.

The Treasury disbursements October 1 in the way of interest amounted to about \$7,000,000. It is figured that corporation payments will be more than \$40,000,000, materially affecting the supplies of money. October interest and dividend disbursements at Boston will aggregate about \$9,000,000, against \$9,963,000 last year. A loan of \$6,000,000 for the construction of the Scott Elevated Railroad in St. Louis has been negotiated in this city through parties representing a Dutch syndicate. The Commissioner of Railroads makes a recommendation covering the settlement of the debt of the Pacific railroads which merits the attention of Congress.

Sterling exchange was dull, and on Tuesday posted rates were reduced to \$4.84 @ \$4.88½.

The aggregate clearings of 42 cities for the last week show an increase of 2½%. Outside New York the increase was 6½%. New York decreased ½%. Philadelphia increased 14, Pittsburgh, 31.5; Kansas City, 10.8; New Orleans, 45.8; Louisville, 16.7; Minneapolis, 73.1. Milwaukee, Cleveland, Indianapolis and Columbus show large gains.

The exports and imports for August show a gratifying improvement not only over the preceding months, but over August of the two previous years. The

excess of imports over exports in August, 1889, being only \$2,704,400, against \$10,767,287 in August, 1888, and \$15,708,580 in August, 1887, so that with a continuance of this rate of improvement large imports of gold may be looked for before the end of the year. Exports for the week amounted to \$7,327,000.

The exports of specie for the week amount to about \$1,000,000 and the value of merchandise imported is \$7,942,000. Since January 1 the imports aggregate \$375,677,500, against \$352,141,000 for the same time last year.

Just at the time when the Erie Canal Forwarding Association decide that they cannot raise canal grain freights a notch higher until October 15, in the face of the strong rail competition, the railroad sledding from Buffalo eastward will advance their rates on both the New England and the New York traffic. The new schedule will go into effect October 7.

The Pennsylvania Company have given notice that on September 30 a reduction in rail and lake freight rates from Pittsburgh to St. Paul and Minneapolis will go into effect.

Hon. Willis S. Paine, superintendent of the State Bank Department, has resigned his office to accept the presidency of the State Trust Company, of New York City, incorporated with a capital of \$1,000,000.

The Thomson-Houston International Electric Company have declared their regular semi-annual dividend of  $\frac{3}{4}$  % on the preferred stock, payable October 10 to stock of October 1.

The stock of the Anniston City (Ala.) Land Company has lately been put on the regular trading list of the Stock Exchange.

## British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, October 3, 1889.

The Block-Tin market was given good support early in the week, but some of the "bull" interest realized largely when opportunity offered, and prices have since declined, although the statistical position is favorable. The fact noted last week that a large portion of the stocks held are not in strong hands has some bearing. The reported Harney Peak Mine deposits are much discussed, but do not affect prices in the absence of facts making it clear that Tin is being turned out in commercial quantities. Business was done to-day at £88. 17/6 for prompt and £89. 5/ for future.

Speculation in Copper has been more active and prices for Merchant Bars have improved, but the trade demand is slack. The higher bank rate for money brought out cash lots, supposed to have been for account of French holders. Judgment has been given in favor of subscribers to the old Comptoir. The advancing of money on Copper certificates by the Board of Directors was declared illegal, and the members have been sentenced to pay £720,000 to the accountant and £40,000 to the liquidator. The statistics of visible supply of Copper in Europe show a decrease of 20 tons on the 1st inst. as compared with a month ago. The Chili charters are wired as 600 tons. There have arrived at Liverpool 1300 tons unsold Anaconda Matte the past fortnight, which has gone into stock, making the total on hand 26,830 tons. The Mason & Barry last dividend is 2 %, against 9 % previously.

Speculation in Pig-Iron Warrants has been exciting. Prices for Scotch advanced

above 50/, and for others proportionately. There was large buying for outside account during the week. The trade demand for Pig of all sorts has been brisk. Additional furnaces are lighting. Nearly all brands of Scotch are quoted at from 6d to 2/6 advance. Middlesborough is up 6d, and Hematites, while showing some irregularity, are quoted 1/ better than last week.

Tin-Plate has continued in active demand and there has been more doing, although buyers generally have shown a disposition to hold back until quarter-day. For Bessemer 13/6 was the ruling price up to to-day, when 3d advance was paid. The Caerlioni Works will restart on Monday next. The Terydail Company, Ammonford, are starting up their new works.

There have been more eager buyers for Old Iron Rails, and American inquiries are coming to the front in some prominence. The Continental markets are firm at advanced rates, and a brisk demand in the French market, with sales at 85 francs, is reported.

Pig-Iron is rather scarce in the French markets, owing to the short supply of Coke at furnaces and available for immediate demand.

Scotch Pig.—The position is the same as last week, business being brisk at the further advance.

No. 1 Coltness, f.o.b. Glasgow	67/6
No. 1 Summerlee, " "	66/
No. 1 Gartsherrie, " "	65/
No. 1 Langloan, " "	66/6
No. 1 Cambro, " "	54/
No. 1 Shotts, " at Leith	66/
No. 1 Glengarnock, " Ardrossan	60/6
No. 1 Dalmeilington, " "	53/
No. 1 Eglinton, " "	53/

Steamer freights, Glasgow to New York, 4/; Liverpool to New York, 10/.

Cleveland Pig.—Prices are 6d up, but business has not been as large this week as last. No. 3 Middlesborough quoted 45/3, prompt.

Bessemer Pig.—A large business still going on; the market continues strong. West Coast brands, mixed numbers, 57/3 @ 57/6, f.o.b. shipping point.

Spiegeleisen.—The demand continues brisk and prices are strong. English 20 % quoted 82/6, f.o.b. at N. W. England shipping point.

Steel Rails.—There is still a large business, but prices are without further change. Heavy sections quoted at £5. 7/6 and light sections £5. 12/6 @ £6. 5/, f.o.b. at N. W. England shipping point.

Steel Blooms.—Quite an active demand for these and prices firm. We quote £4. 10/ @ £4. 12/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—Only a fair business, but prices very firm. Bessemer, 2½ x 2½ inch, £4. 17/6 @ £5, f.o.b. at N. W. England shipping point.

Steel Slabs.—A moderate trade at firm prices. Bessemer, £4. 10/ @ £4. 12/6, f.o.b. at N. W. England shipping point.

Old Rails.—Inquiries numerous, but actual business moderate. Tees quoted at £3. 4/6 and Double Heads £3. 7/6, f.o.b.

Tin-Plate.—The demand fairly active, and 3/ advance paid for Cokes. We quote, f.o.b. Liverpool:

1C Charcoal, Alloway grade	15/3 @ 15/6
1C Bessemer Steel, Coke finish	13/9 @ 14/
1C Siemens " "	13/ @ 14/3
1C Coke, B. V. grade	13/6 @ 13/9
Charcoal Terne, Dean grade	12/ @ 12/3

Scrap-Iron.—Holders very firm, but not much business doing. Heavy Wrought quoted £2. 12/6 @ £2. 15/, f.o.b.

Crop Ends.—A moderate demand only, but prices firm. Bessemer quoted £2. 15 @ £2. 17/6, f.o.b.

Manufactured Iron.—Business fairly active, and prices firm throughout. We quote, f.o.b. Liverpool:

Staff. Marked Bars	£ s. d.	£ s. d.
" Common	7 0 0 @ 7 5 0	8 15 0
Staff. Bl'k Sheet, singles	8 15 0 @ 8 17 6	8 17 6
Welsh Bars (f.o.b. Wales)	6 7 6 @ 7 2 6	7 2 6

Copper.—A fairly active business, with little change in prices. Chili Bars quoted at £42. 17/6, spot, and £41. 10/ three months' futures. Best Selected, £48.

Tin.—The market irregular and unsettled. Straits quoted at £88. 17/6, spot, and £89. 5/ for three month's futures.

Spelter.—The market rather stronger. Quoted at £21. 17/6 for ordinary Silesian.

Lead.—Very moderate business at steady prices. Quoted £12. 10/ for Soft Spanish.

## Foreign Markets.

### EQUIVALENTS

Franc, Peseta or Lira	19.3
Florin (Netherlands)	40.2
Florin (Austria)	35.9
Wileis (Portugal)	41.08
Wileis (Brazil)	54.6
Mark (Germany)	55.8
Pounds	2.205
Kilogram	2.205
Picul	134

### CHILI.

VALPARAISO, August 2, 1889.—Copper.—Mine owners are not anxious to accept ruling prices; sales for the fortnight have therefore been restricted to 3300 quintals at \$16.10 @ \$16.20 and \$17, f.o.b., \$16.10 equaling, cost and freight, £39. 9/7. Coal.—Australians have been neglected at 24/3; Newcastle less neglected at 37/. Exchange.—90 days' sight, private drafts, 24½/ @ 25/.—Weber & Co

### EAST INDIES.

PENANG, August 15, 1889.—Tin.—During the fortnight under review receipts reached 10,000 piculs, Europeans taking thereof 4000 piculs and Chinese an equal amount. Opening at \$33.80 ½ picul, Tin closes at \$34.80 in consequence of some speculative buying by Chinamen. India Rubber.—Brought \$64 ½ picul.—Schmidt, Kustermann & Co.

MANILA, September 23, 1889.—Hemp.—Has been nominal at \$14 ½ picul, against \$9.87½ same date last year, equaling ½ ton, cost and freight, £44. 5/, against £35. 17/6. There have been no clearances for the United States, against 12,000 bales during the corresponding week last year, and 152,000, against 137,000 since January 1, leaving 10,000, against 36,000 loading. Clearances for England since January 1, 231,000 bales, against 252,000 in 1888; loading for ditto, none, against 13,000; cleared for all other countries, 35,000, against 55,000; receipts at all ports since last cable, 13,000, against 18,000, and since January 1, 438,000 bales, as compared with 457,000 in 1888 and 367,000 in 1887. Freight.—\$5, against \$6. Exchange.—Six months' sight on London, 3/5½, against 3/5¼.—Ker & Co., per cable direct to their agent in New York, Mr. Charles Nordhaus, 89 Water street.

COLOMBO, CEYLON, August 22, 1889.—Plumbago.—Is very firm and scarce at the following quotations, in rupees, ½ ton: Large lumps, 145 @ 170; ordinary ditto, 125 @ 160; Chips, 80 @ 95, and Dust, 40 @ 65. Since October 1 the shipments have been distributed as follows in cwt.: To England, 138,272; to Venice, 102; to Hamburg, 7816; to Bremen, 1254; to Antwerp, 12,844; to Holland, 457; to India, 139; to Australia, 302, and to the United States, 126,435; together, 287,691 cwt., against 217,926 in 1888, 220,221 in 1887 and 177,262 in 1886. Coir Yarn.—Nos. 1 to 4, is selling at 7 @ 13 rupees ½ cwt. Exchange.—Six months' sight, 1/4 19-32.—Volkart Bros., Ceylon and Malabar Coast, to their agent in New York, Mr. John W. Greene, 82 Wall street

### SPAIN.

BILBAO, September 14, 1889.—Iron Ore.—Rubios have been so scarce that as much as 8/ was paid, while for forward delivery the figure is 7/, at which contracts were made. Campanil deliverable next year has been done at 9/6, and one mine owner sold all he will be able to turn out in 1890 at 10/, the amount being 45,000 to 50,000 tons. The number of steamers ready to load Ore has been reduced



to 28 at this writing. Total Ore shipments hence since January 1 sum up 2,767,157 tons, as compared with 2,717,879 same time last year and 3,308,436 in 1887. *Pig-Iron*.—There were shipped coastwise 1319 tons, and the steamer Ciscar has cleared with a full cargo for Hamburg.—*Bilbao Marítimo y Comercial*.

#### BELGIUM.

BRUSSELS, September 21, 1889.—*Iron*.—Prices of Merchant Iron and Plates are tending upward in consequence of the scarcity of Pig. Orders meanwhile abundant. French competition in Beams has ceased since prices have advanced there likewise. A comparison of prices with those ruling in 1875 shows that Coke was then as dear as at present, but that Forge then commanded 8.25 francs the 100 kg.; Foundry No. 5, 10; and Merchant No. 1, 18.50. If Coke does not decline Iron has therefore every chance to rise in value.—*Moniteur des Intérêts Matériels*.

#### GERMANY.

HAMBURG, September 21, 1889.—*Iron*.—There has seldom been as lively a demand for Pig-Iron in Rhenish-Westphalia as was the case during the week ending to-day. Spiegel remains steady at 76 marks  $\frac{1}{2}$  ton. It is difficult to obtain any further amounts for delivery the first quarter of 1890 of Forge Pig. Foundry Pig is active and higher; this may also be said of Bessemer and Thomas. Forge may be quoted 57 @ 70; Foundry, 63 @ 73; White Steel, 68.50 @ 70; German Bessemer, 67 @ 68, and Thomas, 56 @ 58. The amount of orders booked for Finished fill the balance of the year; some have even secured work ahead for the coming six months. The margin of profit is slight, in view of the high cost of Pig. The Wire branch develops no encouraging features, and thus forms an exception. Foundries, machine and car shops are all doing well. Wire Rods are worth 127.50 @ 135; Steel Rails, 135 @ 140.—*Borsenhalle*.

#### The Compressed-Air System in Paris.

At the Newcastle meeting of the British Association Alexander B. W. Kennedy presented a valuable paper, in which he described the transmission of power by means of compressed air in Paris—the Popp system—and in which he gave an account of certain tests made by him to show the efficiency of the plant. Of the four methods of transmitting power to a distance—steam, water, air and electricity—all may be said to be in more or less successful operation. Steam is successfully employed in New York City for heating and power purposes; water for power purposes is in use by the Hydraulic Power Company in London and in Hull, while electricity, upon more or less extended scales, is in use in innumerable localities, and finally the method of transmission by means of compressed air has but one exponent, that in Paris. Mr. Kennedy in his paper states that while the plans and methods adopted in Paris are by no means perfect, they are still receiving such improvements as will in all probability result in most materially raising the efficiency of the plant as a whole.

The original works consisted in the pneumatic clock system, which was started about 1870, with a small central station near the center of Paris. Its business grew so rapidly as to soon necessitate a central station provided with large machinery, and the business of which increased until about 3000 pneumatic clocks, public and private, were driven and regulated by a standard clock in the station. This work, although it formed the initiative, now only comprises a very small part of the work done by means of air. Until two years ago a pair of single-cylinder horizontal engines, together with a beam engine, provided ample power for the whole work, but the demand for compressed air for the working of motors becoming imperative, the present plant of six compound condensing engines, each working two compressors, was erected. This plant can develop considerably over 2000 horse-power, and during certain hours of the day is at work to its full capacity.

The general system of working is extremely simple. The air is compressed to a pressure of six atmospheres absolute, and is drawn from the compressors to large

boiler-plate receivers, which act as reservoirs. It was found that the air entered the compressors at a temperature of about 70° F., which temperature was again assumed after it had passed along the mains a little distance. From the reservoirs, some of which are arranged to act as separators in which a large body of cooling water is carried along mechanically by the air, the air enters the mains. The principal main is 11 $\frac{5}{16}$  inches in diameter and about  $\frac{3}{8}$  inch thick. An important point was here brought out in the construction of this main, which allowed a certain degree of distortion without effecting the joint, and which permitted of expansion and contraction within certain limits. The main is of cast-iron, made in lengths perfectly plain at both ends, and connected by a very simple external joint made airtight by India rubber packing-rings. This method of jointing leaves the pipe quite free endwise, and also provides for all necessary sidewise movement. The mains are laid partly under roadways and footways and are partly slung from the roof of the sewer subways. At stated intervals they are provided with automatic float-traps for carrying off the entrained water. On entering a building on its way to a motor the air first passes through a meter, but as the quantity passing is too great to allow the use of anything like an ordinary gas-meter, only inferential meters have been found to be successful. The air from the meter passes through a reducing-valve, by which the initial pressure in the motor is prevented from rising above a certain limit, which in practice varies between three and one-half and five and one-half atmospheres absolute, according to the size of the motor and the work it is expected to perform. Between the reducing-valve and the motor there is placed in all ordinary cases a small heater, which is simply a double cylindrical box of cast-iron having an air-space between its outer and inner walls. The air traverses this space and is compelled by suitably arranged baffles to circulate in such a course as to come in contact with its whole surface. A coke fire is lit in the interior of the stove, and the products of combustion are carried over the top and made to pass downward over its exterior surface, inside a sheet-iron casing, on their way to the flue. The heater for the motor on which the experiments were made, and which indicated 10 to 12 horse-power, was 21 inches in diameter and 24 feet high over all.

The motors used in connection with the system are of two types. Up to 1 horse-power or thereabouts small rotary engines are used. These start readily, are easily governed, and are provided with automatic lubricators, worked by compressed air, run at a very high speed, and are altogether very convenient. They use the air with little or no expansion and without previous heating. The larger-sized motors, up to double-cylinder engines 12 x 14 inches, which is the largest size used, are simply ordinary Davey-Paxman steam-engines, employed for air absolutely without any alteration or modification. In many cases these engines have automatic cut-off gear controlled by the governor, and can therefore easily work with the largest economical ratio of expansion. Although heaters are in every case provided for these engines, they are used sparingly where both power and refrigeration, due to the cooling resulting from expansion, are required. This in brief is the system as now in operation.

The method pursued by Mr. Kennedy to ascertain the economical efficiency of the system need not be described in detail. Summarizing the results, it was found that the compressed-air transmission system is

now carried on on a large commercial scale in Paris in such a fashion that a small motor four miles away from the central station can indicate in round numbers 10 horse-power for 20 indicated horse-power at the station itself, allowing for the value of the coke used in heating, or for 25 indicated horse-power if the air be not heated at all. Larger motors may work somewhat more economically, while the smaller motors may show poorer results. The paper further states that the engineers of the company, by no means content with the results already obtained, are experimenting in various directions with a view to greater economy, and there is no doubt but that they will attain the end sought. We quote as follows from the paper:

A system of transmission which has actually been carried out on a large commercial scale in such a way as to have indicated efficiency of 50 per cent. between prime mover and secondary motor, four or five miles apart, is one which needs no adventitious aids to commend it to notice, especially where its uses are so numerous and so varied and its convenience so extremely great as are those of compressed air. Both M. Victor Popp, who has organized and carried through the work of the Paris company, and Mr. James Paxman, who has designed and made the greater part of the machinery used, are to be heartily congratulated on the results which have attended their work.

#### The Cross Battery for Electric Lighting.

Dr. E. D. Cross, 3151 Indiana avenue, Chicago, has recently given some private exhibitions of an electric apparatus of a novel character which he has invented. Dr. Cross claims to be the possessor of seven patents, all in the nature of improvements in regard to electric light. His chief claim is that he dispenses with the dynamo entirely, the power, whether for lighting or for furnishing the motive power for running an engine, being derived direct from the battery. The battery is of unique construction and is said to be much cheaper in construction and cost of running than any other. He claims also that by the use of hollow carbon tubes he has avoided polarization, and that the batteries can be placed in any room without danger to the occupants. He uses a solution of nitric acid and nitrate of ammonia for the outside shell of the battery, and by conducting the fumes from this product into water neutralizes any bad effects which they might have if given off into the air. Further, it is alleged that the consumption of zinc and acid is much less in the Cross battery than in any now in use.

A report made by the representative of one of the Chicago dailies states that at a trial of the apparatus at which he was present the light furnished by the batteries in operation was certainly of the best and was given without interruption. At the same time a motor of  $\frac{1}{2}$  horse-power was operated with the force supplied by nine batteries. It is claimed that these batteries, costing \$1 each, can be operated for 20 cents per month, and that five 16-candle-power electric lights can be furnished for 30 cents per month. A sewing-machine was operated by the motor with regularity, and other demonstrations of its efficiency were given.

The penalties of violating French commercial law fell heavily upon the late copper syndicate in the case brought by the Comptoir d'Escompte against the heirs of the late M. Denfert-Rochereau, the manager, the directors and censors of the company. The court held them responsible for the enormous losses that occurred and condemned them to pay the sum of \$2,400,000. Other directors, though their commercial integrity was above suspicion, committed a grave fault in not opposing the illegal action of the manager and were condemned in smaller amounts.

## Hardware.

The volume of business continues fair, trade moving steadily. The principal feature of the market is the improved tone in prices, especially of heavy Hardware, the condition referred to in our last issue continuing. The advance in raw material is making itself felt in the prices of the manufactured goods, in which, while there have been comparatively few announced advances, there is along nearly the whole line a firmer tone, and concessions are being withdrawn, low quotations recalled, and in some instances higher prices named. Manufacturers are, however, moving very conservatively in this direction, and the advances which have thus far taken place have been nearly all under the pressure of necessity, the cost of making the goods preventing their profitable sale at the old figures. In addition to the increased cost of raw material there are also in certain quarters indications of restlessness in the labor market, and it is not unlikely that if the present condition of things continues there will be demands made for increased wages. In this state of things the trade feel justified in purchasing for the requirements of their business with perhaps more freedom than heretofore, though there is little disposition to place speculative orders. The excellent condition of business generally throughout the country and the conservative course pursued by merchants and manufacturers are also features of the situation. The manner in which trade is increasing in the South and in the far Northwest is also very gratifying, giving promise of more business in these parts of the country in the near future than at any time in the past.

### Wire Nails.

The market is characterized by a decidedly firm tone, the improvement referred to in our last issue having continued until manufacturers generally are asking the advanced prices. The general quotation at factory is \$2.50 base, with a rebate of 10 cents per keg for carload lots. Factories are in most cases well supplied with orders, and in only exceptional instances is there any disposition to make concessions. There is also on the part of the holders of Nails purchased at the late low prices a disposition to take advantage of the advance in the market, and the Nails from jobbers are thus quotably higher. The Chicago jobbers met yesterday and agreed to advance the price to \$2.50, with a rebate of 5 cents in carload lots. At the same time they made the price of Steel Nails \$2.20. It will be the part of wisdom for other holders of the goods to pursue a similar course, and realize the profit which is permitted by the low figures at which the nails were bought.

### Miscellaneous Prices.

The Moore Mfg. and Foundry Company, of Milwaukee, Wis., have issued under date of September, 1889, a new catalogue of their Hardware Specialties. The catalogue embraces 92 pages of well-executed illustrations of the goods made by the company, together with full descriptions and price-lists. The goods shown cover Door-Hangers (for dwellings, warehouses, elevators, street-cars, freight-cars, &c.), Registers, Brackets, Coat and Harness Hooks, Sash-Pulleys, Tackle-Blocks, Overhead Carriers, Hand-Hoists, Hoisting Engines, Dumping Cars, Detachable-Link Chains, &c. Tables are also given of the weight of flat Rolled Iron per lineal foot, value of Iron per gross ton when the pound price is given of 1 to 6 cents per pound; weight of round and square Rolled Iron,

weight and strength of Cordage, strength of Hooks and strength of Iron Chains, which is just such information as constructors of tackle or hoisting apparatus often desire. The following revised discount sheet of their specialties has just been issued by the company; terms 60 days, a 3 per cent discount for cash in 10 days:

Page of catalogue.	Discount.
4, 5, 6, Wild West Door-Hangers.....	45%
7, Magic Door-Hangers.....	45%
9, Wrought Bracket Rail.....	25%
10, Plain Rail.....	25%
10, Cast Brackets.....	25%
11, Double-Flange Barn-Door Rail, $\varnothing$ 100 feet, \$1.30, net.	
11, Double-Flange Rail, extra heavy, $\varnothing$ 100 feet, \$3.20, net.	
11, Adjustable Barn-Door Stay-Rollers.....	50%
12, Climax Barn-Door Hangers.....	60%
13, " " wood track.....	55%
14, Zenith Barn-Door Hangers.....	55%
15, No. 500 Steel Hangers.....	45%
16, No. 315 B. C. D. Hangers.....	33%
17, No. 340 Parlor-Door Hangers.....	45%
18, 19, Railroad Hangers.....	55%
20, No. 330 Elevator-Door Hangers.....	33%
21, No. 325.....	33%
22, No. 320 Baggage-Car-Door Hangers.....	33%
23, Street-Car-Door Hangers.....	50%
24, Elevator-Door Locks.....	33%
31 to 37, Registers and Ventilators.....	70%
38, Cylinder Rings.....	33%
39 to 41, Shelf Brackets.....	70%
42, Boiler-Handles.....	45%
43, Clothes-Line Hooks.....	70%
44, Coat and Hat Hooks.....	70%
45, Hotel and School-House Hooks.....	70%
46, 47, Harness-Hooks.....	70%
48, Stable Fixtures.....	55%
49 to 53, Sash-Pulleys.....	50%
54, Dumb-Waiter Pulleys.....	50%
55, Sliding-Door Sheaves.....	50%
56, 57, Ceiling or End Pulleys.....	40%
58, Acme Barn-Door Rollers.....	55%
59, Sheaves for Novelty Blocks.....	50%
60, 61, 62, Novelty Tackle-Blocks.....	50%
63, Snatch-Blocks.....	50%
64, Bucket-Blocks.....	25%
65, 66, Tackle-Blocks.....	50%
67, Anti-Friction Side Pulleys.....	50%
68 to 71, Boyd's Hay-Carriers.....	45%
72, Anti-Friction Hay-Fork Pulleys.....	40%
72, Floor-Hooks.....	45%
73, Carriers for Hand-Hoists.....	20%
74, 75, Differential Pulley-Blocks.....	40%
76, 77, Hand-Hoists.....	20%
78, Parts for Differential Pulley-Blocks.....	40%
78, Parts for Hand-Hoists.....	40%
79, Anti-Friction Door-Rollers.....	50%
85, Log-Binders.....	25%
86, Log Haul-Chain.....	25%

The manufacturers of Heavy Hammers still retain their association, but the attempt to control prices or production has been abandoned. The market is accordingly an open one and prices are quotably lower.

The improvement in Strap and T Hinges and Wrought Butts, to which we referred in our last issue, still continues and manufacturers are showing a disposition to hold the goods firmly at an advance beyond the low prices recently ruling. There is considerable activity in these goods and most of the factories are well stocked with orders.

It will be observed that J. B. Timberlake, Jackson, Mich., in his advertisement on page 82 calls attention to the Rocking Ash-Sifter, an illustration of which is there given. Its simplicity, the efficiency of its operation, the fact that it fits any flour-barrel and raises no dust are points that are made in regard to it. These Sifters are referred to as sold at \$13 per dozen, f.o.b. factory; subject to a discount of 5 per cent. for cash in ten days.

The Tuthill Spring Company, Hammond, Ind., issue a circular relating to the reduction, August 9, in the price of Elliptic, Concord and Platform Springs, the discount being made 60 and 10 and 10 per cent. from standard list; terms, four months, or 3 per cent. discount for cash. It is also stated that to parties purchasing Springs to the amount of \$1000 before September 1, 1890, a rebate of 5 per cent. will be allowed, and to parties purchasing Springs to the amount of \$2000 or more before September 1, 1889, a rebate of 10 per cent. will be allowed. These rebates, which, it will be observed, are different from those which were formerly given, will be allowed when the full amount of goods is taken.

I. S. Spencer's Sons, Guilford, Conn., for whom the S. A. Haines Company, 90 Chambers street, New York, are selling agents, issue a price-list of Even-Balance or Tea Scales, in which the different patterns are illustrated. Blake's Pattern Nut-Crack is also represented and attention called to their line of Mortise Door-Locks, Brass Bolts, Keys, &c. The following is the price-list of Scales, which is subject to a discount of 45 per cent., f.o.b. New York, terms, 60 days, or 2 per cent. discount for cash in 10 days:

### Even-Balance or Tea Scales.

No.	Capacity.	Style of finish.	Per dozen.
160	2 pounds.	Japanned.....	\$12.00
161	4 " "	" " " " " "	13.00
160 1/2	2 " "	" " Red Striped.....	14.00
161 1/2	4 " "	" " " " " "	15.00

Put up one-quarter dozen in a case, with weights complete.

No.	Capacity.	Style of finish.	Per dozen.
260	2 pounds.	Japanned, with two plates.....	\$14.00
261	4 " "	Japanned, with two plates.....	15.00
260 1/2	2 " "	Japanned, Red Striped, with two plates.....	16.00
261 1/2	4 " "	Japanned, Red Striped, with two plates.....	17.00

Put up one in heavy paste-board box, with weights complete. Packed one-half dozen in a case.

No.	Capacity.	Style of finish.	Per dozen.
41	4 pounds.	Japanned.....	\$20.00
42	4 " "	" " and Red and Gold Striped.....	22.00
43	4 " "	Vermilion and Gold Striped.....	24.00

Put up one-quarter dozen in a case, with weights complete.

### Standard Scales.

No.	Capacity.	Style of finish.	Per dozen.
81	8 pounds.	Japanned.....	\$34.00
82	8 " "	" " and Red and Gold Striped.....	37.00
83	8 " "	Vermilion and Gold Striped.....	40.00

Put up one in a case, with weights complete.  
Hatch's Even Balance.

No.	Capacity.	Style of finish.	Per dozen.
171	8 pounds.	Japanned.....	\$31.50
172	12 " "	" " " " " "	35.00
172 1/2	12 " "	" " Red.....	30.00

Packed one in a case, with weights complete.

### Blakes' Pattern Nut-Crack.

No. 10. Japanned, Stained-Wood Base... \$3.00  
Packed half gross in a case.

### False Marking for Shipment.

While it is generally understood that the Interstate Commerce act forbids the false marking of goods for shipment by which they might be given a lower classification, there are still a few instances in which this is done, and more frequently such false marking is requested by purchasers who have not entirely broken away from the old method and accepted the new order of things. Those who recall the manner in which Hardware until recently has been designated for shipment, immense quantities of assorted goods going out as "Bolts," "Roofing-Plates" or "Rosin,"



sometimes find it difficult to conform to the stringent requirements of the existing law. It is well, however, for the trade to remember that any such marking of packages as tends to mislead the carriers, thus changing the class and reducing the charges for freight, is by law prohibited, the penalties for such violation being severe, as will be seen from the following extract from the Interstate Commerce act, as amended by the act of March 2, 1889, which in section 10 provides that "any person and any officer, or agent of any corporation or company, who shall deliver property for transportation to any common carrier, subject to the provisions of this act, or for whom as consignor or consignee any such carrier shall transport property, who shall knowingly and willfully, by false billing, false classification, false weighing, false representation of the contents of the package, or false representation of weight, or by any other device or means, whether with or without the consent or connivance of the carrier, its agent or agents, obtain transportation for such property at less than the regular rates, shall be deemed guilty of fraud, which is hereby declared to be a misdemeanor." As defined in another section the punishment for each offense is a fine not exceeding \$5000, or imprisonment in the penitentiary for a term not exceeding two years, or both, in the discretion of the court. The above applies to shipments from one State to another, but in the case of transportation wholly within this State an indictment might be found under Section 577 of the Penal Code, providing that "a person guilty of preparing, making or subscribing a false or fraudulent manifest, invoice, bill of lading or ship's register or protest, with intent to defraud another, is punishable by imprisonment in State prison for a term not exceeding three years, or by a fine not exceeding \$1000, or both," and similar statutes have been enacted in most of the other States.

#### Items.

Pike Mfg. Company, Pike Station, N. H., issue a circular calling attention to a new brand of Washita Oil-Stone, Lily White, the very fine quality of which is especially referred to. They also call attention to their Rosy Red Washita, to the excellence of which they allude. Both the Lily White and Rosy Red are warranted.

By the advertisement on the first page of cover it will be observed that A. J. Jordan, manufacturer of the A&A1 Cutlery, has removed from the old stand on Washington avenue to 417 North Broadway, St. Louis, Mo.

Hibbard, Spencer, Bartlett & Co., of Chicago, have just issued one of the largest, handsomest and most complete Lamp catalogues put forth by any house. It comprises 124 broad pages. In an opening announcement to their friends and customers the firm say that their experiment of a year ago when they entered the Lamp trade with but one line, the Rochester, has encouraged them to continue that department of their business on a more extended scale. They have added a large variety of other makes, and now claim to have in their stock the most complete assortment of Lamps and everything pertaining to them to be found in the United States. The department also embraces a very complete assortment of Table Glass-Ware, of which a special catalogue will shortly be issued. The Lamp catalogue begins with illustrations of the Mammoth Rochester Lamps, then follow Central Draft Mammoth Lamps, with patent automatic spring extension, then 20 pages of Library Lamps in a profusion of styles, 5 pages of Hall Lamps, 13 pages of Chandeliers, 7 pages of

Extension Piano Lamps, specimens of New-el Post or Desk Lamps and Bouquet Lamps, 14 pages of Stand or Table Lamps, 8 pages of Shades, 18 pages of Glass Stand Lamps, Student Lamps and Bracket Lamps, and a great variety of Burners, Chimneys, Oil-Cans, Lanterns, &c. The great extent of the stock is indicated by the space required in the catalogue for the several classes of goods. An ingenious system of numbering has been adopted in this catalogue, to save repetitions. For instance, the Library Lamps are made either with a Spring Extension or a Ball-Weight Extension. There are six letters in "spring" and four letters in "ball." Hence the numbering of Library Lamps has been arranged to begin with either 6 or 4, to distinguish spring from ball. The glass shades for Library and Table Lamps have their size indicated in the first figures of their number; for instance, 1010 refers to a 10-inch shade, 1405 to a 14-inch shade, 701 to a 7-inch shade, &c. The engravings in this book are of a notably high order of merit, fully worthy of the handsome goods which they so well portray.

The trade will observe the advertisement on page 72 in which the Henry Seymour Cutlery Company, Holyoke, Mass., call attention to their Shears and Scissors, and also their offer to send samples to retailers who are not now handling the goods, and also a copy of their price-list, embossed show-card, yearly calendar and blotter-pad. The latter is referred to as something entirely new and to be issued January 1.

The advertisement on page 79 in which Morley Bros., East Saginaw, Mich., indicate some of their manufactures will be regarded with interest. In it their patent Railroad Step-Ladder is illustrated, with the statement that 2000 of these Ladders are now in use. In addition to their use in Hardware stores they have also been introduced in other stores, also in public libraries and in some of the departments at Washington, where their convenience and utility are referred to in gratifying terms. The well-known Blue Line Lumbering Tools are also illustrated.

Ajax Mfg. Company, Post-office box 261, Pittsburgh, Pa., issue circulars describing their Ajax Boring-Machine, Collins' Roller Tube-Expander, the Standard and IXL Saw-Gummers, Leslie's patent Expanded Saw Swage and Sharpener, Vulcan Mower Knife-Sharpener and Standard Farm Feed-Mill.

Reading Iron Company, Reading Pa., issue in convenient form the revised price-list of Wrought-Iron Pipe as adopted by the manufacturers September 18.

The William Cable Excelsior Wire Mfg. Company, 43 Fulton street, New York, have issued under date of September 18 their illustrated catalogue No. 42, which in 80 pages represents the various articles manufactured and for sale by them. They state that for the third time since being in business it has been necessary for them to erect additional buildings, and they now have large and commodious premises equipped with the most approved machinery, among which they allude especially to the patent automatic wire-drawing machine. The line represented in the catalogue is large and varied. As a departure from the usual contents of price-lists, it is to be noticed that it contains the following references to Wire, which will be read with interest:

The first mention of Wire in sacred history is as follows: "And they did beat the gold into thin plates, and cut it into wires to work it in the blue, and in the purple, and in the scarlet, and in the fine linen, with cunning work."—Exodus xxxix, 3.

Wire-drawing by the Egyptians was first by the most ductile metals, such as gold and silver, being used before brass or iron, because

the Wire was originally employed for ornamental purposes. Gold thread and Wire were made even to the time of the later Roman emperors.

The appearance of some Wire found in Thebes justifies the belief that the art of Wire-drawing was known to the ancient Egyptians. This Wire is not supposed to have been drawn, like our own, through holes in metal plates, or diamonds or rubies.

Shakespeare takes cognizance of Wire: "And thou shalt be whipped with wire."—*Antony and Cleopatra*.

Oneida Community, Community, N. Y., have issued a new descriptive list of their Newhouse and other Steel Traps, Halter-Chains, Cow-Ties, Dog-Chains, &c., illustrations of which are given in the usual clear and satisfactory manner.

P. Lowentraut, Newark, N. J., has issued a new catalogue which bears evidence of the constant extension of his business and the enlargement of the line of goods manufactured, as 82 pages are used in representation of his varied line. The catalogue opens with Skates and shows in its pages an extensive assortment of Tools, specialties, &c.

Whitaker Iron Company have removed from No. 12 Cliff street to Nos. 81 and 83 Fulton street, New York, Market and Fulton National Bank Building.

H. W. Humphrey, Unionville, Conn., issues circulars relating to his line of Iron Tinned Table and Tea Spoons, Forks, Egg-Beaters, Cake-Turners, Potato-Measures and similar specialties.

It will be observed that Alfred Field & Co., 93 Chambers street, New York, in the special notice on page 70, announce their desire to engage two first-class travelers, one for the Southern trade and another for the Western. Those who are qualified to fill these positions will recognize this opening as an exceptionally desirable one.

An interesting line of Miter-Boxes is represented on page 113, in which L. H. Olmsted, Corona, N. J., illustrates the different styles which he is putting on the market.

Sanford & Hawley, Unionville, Conn., are manufacturers of Wood Choker and New Union Mouse-Traps. The making of this line of goods in connection with their wood-working is referred to as enabling them to do it to advantage and to market the goods at reasonable figures.

The Wolcott Hardware Company, Hartford Conn., for whom Wm. H. Jacobus, 90 Chambers street, New York, is agent, are issuing a circular relating to their Burglar-Proof Sash-Fasteners, which are illustrated. The list prices are also given.

Perkins Bros., Bridgewater, Mass., issue the Wire-Nail card in convenient form and call special attention to their Improved-Finish Nails, which are described as holding 50 per cent. more than any other Nails. They also allude to their Double-Pointed Steel Tacks.

Hawkins Nail-Puller Company, Terre Haute, Ind., issue a circular describing Hawkins' patent Nail-Puller, a description of which we recently gave in these columns. The advantages possessed by these Pullers are pointed out and a number of testimonials given from business men in Terre Haute in regard to their merit.

Fulton Iron and Engine Works, Detroit, Mich., have issued a new edition of their illustrated catalogue, which is of the same general style as their last, but enlarged by the addition of new goods, testimonials, &c.

John Kendall & Co., New Lebanon, N. Y., for whom Surpluss, Dunn & Alder, 97 Chambers street, New York, are agents, in addition to their regular line of Thermometers, Barometers, &c., also make Thermometers for use in incubators.

and brooders. They also make an Aneroid Barometer, which they refer to as reliable and cheap, for farmers' use.

### Hardware Third Class.

From a prominent manufacturer we have received the following communication in regard to freight-classification matters, with a special reference to the putting of Hardware in third class. Our correspondent, it will be observed, points out that while this concession has been made, it is deprived of much of its force by the fact that many Hardware goods are "otherwise specified," and thus put often in second and sometimes in first class. The point is also made that Hardware as a whole is given an unduly high classification. Our correspondent's views are deserving of careful consideration:

The discussions in the columns of your valued paper in reference to a just freight classification for Hardware has done so much good that the railroad freight classification committee recognized the justice of the demand and have made a "nominal" reduction on general Hardware from second to third class. I would consider this reduction as something real if they had not attached to this change the letters "N. O. S." In the freight-classification pamphlet before me it says: "*Note.—All articles of iron or steel manufacture when fitted, painted, japanned, bronzed, coppered, acid coppered, plated, tinned, galvanized, or when joined together in the rough, will be considered as Hardware and classified accordingly, unless otherwise specified in the classification.*"

When you examine the items in this pamphlet that are "otherwise specified" and put or left in second class the practical effect of this advertised reduction materializes as a very small matter indeed. Almost every specialty of any note in the Hardware line has been "otherwise specified," and some articles put in the fourth class are of a higher value per pound than others retained in the second class. Cases containing an assortment of various articles of Hardware are almost certain to have some article in belonging to the second class, and if so, by the rule, the whole case must go as second class. It looks very much as if there had been no real intention to give the trade the advantage of a lower classification, otherwise there would not have been made so many exceptions under the head of "otherwise specified." I believe I am quite safe in stating that average Hardware pays a higher rate of freight in proportion to its value than any other line of goods.

The same correspondent refers as follows to the desirability of making the freight rates correspond as far as may be to the value of the articles carried:

If it is the desire of the railroad companies to simplify this whole freight system, why can they not make the freight rates to correspond to the value of the article carried? Packages of similar size and weight cost no more to carry whether they contain flour, sugar, dry goods or Hardware, but if lost in transit and the railroad company have to make good the loss, then the difference in value will become a factor, for which reason a higher rate of freight should be paid for the more valuable article; but if the shipper of an article of greater value is willing to take the risk of its reaching its destination all right by limiting the liability of the carrier to a lower value, why should the shipper under such circumstances not be permitted to ship at a correspondingly low rate of freight? Upon such a basis several classes of freight and corresponding rates could be made, the lowest of value, say, below 2 cents per pound, the

next between 3 and 5 cents per pound, the next 6 to 10 cents per pound, then 11 to 20 cents per pound, and so on, without regard to what the goods are, the shipper merely inserting the value per pound in his receipt or bill of lading, to which he limits his claim in case goods are lost in transit, and paying a freight rate corresponding to this value—of course, always presupposing that the bulk and weight of package come within reasonable limits. As you have made some success in agitating this freight controversy, possibly you can by continuing to do so insure still better results to your patrons.

### Business Methods.

Robert Donahue, Burlington, Iowa, uses a large number of leaflets or small circulars relating to special lines of goods which he is handling, in which the articles are illustrated and some points made in regard to their desirability. In this way the attention of his customers is called to special offers made, suggestions in regard to the utility and merit of the goods, &c. We mention this as an evidence of enterprise and a method of advertising which is resorted to by Hardware men less generally than would be to their advantage. There is no doubt that this method judiciously used would result in increased sales.

A correspondent mentions that there is a disposition in certain points of the West to substitute cuts of goods for samples of the goods themselves on drawers or boxes on shelves. Others keep the goods in the original packages and have sample-boards hinged on shelf divisions. These boards are about 10 inches wide and 30 inches long, the hinges being simply a screw-eye and a screw-hook, two of each in board and two in shelving.

The question as to the inflexible maintaining of prices in a retail store is one which the merchant has frequently to meet, and there is something to be said on both sides, with the great preponderance of argument in favor of having one price. There are, however, many merchants who in special cases make concessions, and the experience of one such is referred to in the following paragraph:

When I first started out in business, observed a dealer, I would frequently cut under my regular prices in order to effect sales, but under no consideration would I allow my clerks to make any reductions. In about a month I saw I had made the biggest kind of a mistake. Customers would come into my store, and when a clerk offered to attend to their wants they would quietly say that they would wait until the proprietor was at leisure. If the clerks said that I would be occupied for some time to come, they would reply that they would come back later, and the chances were that they would go some place else and buy. The result was, I not only lost customers, but I was worked to death, while my clerks were taking it easy. I then turned over a new leaf. I never made a concession that my employees could not make, and in a few months my customers were as well satisfied with the prices quoted by my clerks as they once were with the prices given by me. I know of merchants to-day, however, who do this very thing, and they have been in business, too, long enough to learn better.

It has often been said that the Hardware stock is necessarily rather unattractive for store display, and this is made to be the reason by which the neglect and indifference which sometimes prevail in the arrangement of such a stock are justified. But, on the other hand, as has been pointed out in some of the many valuable suggestions which have appeared in these columns, a great deal of taste may be exercised and in such a way as to secure an attractive display, producing a very pleasant

impression on entering the store, while at the same time the goods are shown off to advantage. There certainly has been a marked improvement in this respect since the subject began to receive attention, but it is evident that the end has not been reached, and that the tendency in Hardware-store arrangement will be toward more and more attractive displays of the goods as approved methods are brought into use and increased attention is given not merely to convenience of arrangement, but also to the attractiveness of the display, with the probable introduction of features more and more artistic. This is a matter which is deserving the careful attention of enterprising and progressive Hardware men, and in this field there is still room for originality and taste. Referring to some features of this subject, *Ironmongery* remarks:

There are few shops more attractive than the iron-monger's when the stock is varied, well disposed and well kept, and there are few shops more forbidding when the opposite conditions prevail. We are sorry to say that these opposite conditions do very often prevail, and the customer who enters for some trifling article gets out again as soon as possible, finding nothing displayed before him to delight the eye or arouse curiosity, but feeling inexpressibly dingy and dusty. All this is so very unnecessary. The true art of shop-keeping is to tempt a customer to buy what he had no thought of buying when he entered, and this is a feat which the iron-monger has quite as good a chance of performing as any other. His stock is emphatically a utility stock, and that household must be marvellously well supplied which lacks nothing that he could furnish. An iron-monger's catalogue is as interesting to a housewife as a draper's. A handsome stock of useful goods would be even more tempting. Moreover, keep watch for novelties as they appear, and the columns of the trade papers will give earlier information of new goods than the circulars or travelers of manufacturers. Novelties will never fail to attract attention, and the judicious iron-monger will always be on the alert to secure baits of that description. Having secured them he will display them to the best advantage. We have been in shops whose whole aspect seemed to say, "Buy what you came for as soon as possible and get out again."

### Freight as an Element of Cost.

The question of our Pacific Coast correspondent in regard to the best method of getting at the cost of goods, especially with reference to freight charges, has called out a considerable number of replies. From those received we make the following extracts, which give the views of leading Hardware men, some of whom are in the Far West, whose freights are therefore an important item:

COLORADO.—We find what relative proportion the freight bears to the list, not the net amount. To illustrate, we purchase \$1000 list of Strap-Hinges at 75 per cent. discount, f.o.b. factory. When railroad expense bill is presented to us we find the freight to be \$150, which is equal to 15 per cent. of the list. Our goods then cost us 15 per cent. freight and 25 per cent. at factory, equal to 40 per cent. of the list; or, in dollars and cents, \$150 freight and \$250 at factory, equal to \$400, or 60 per cent. discount from list. Now, suppose the next invoice of Strap-Hinges we purchase the market has advanced (freight rates, however, the same) and we pay 70 per cent. off. We then have the following simple problem: Cost at factory, 30 per cent.; freight, 15 per cent.; equal to 45 per cent. of the list, or 55 per cent. discount from list. The second invoice of Hinges might perhaps be a different assortment than our first, and we find the freight is 16 per cent. of list; the third



still different, and is 14 per cent. In this event we then make 15 per cent. of the list the average freight.

We have found, as our Pacific Coast friend has, that the freight on some sizes, say, of Butts, is more than on others. This we explain by weighing a case of 3 x 3 L. P. Butts, and find freight to be, say, 10 per cent. of the list; on 4 x 4 Butts, 12 per cent.; 5 x 5, 15 per cent. Butts, say, cost 80 per cent. off at factory; then our 3 x 3 cost 80 per cent., less freight, 10 per cent., equal to 70 per cent.; 4 x 4, less 12 per cent., or 68 per cent.; 5 x 5, less 15 per cent., or 65 per cent. discount from list, laid down in store. By figuring cost based on list one can have his cost-book read as follows: Example.—Strap Hinges, 75 per cent. at factory, freight, 15 per cent., equal to 60 per cent. in store. Should the discount change, say, to 70 and 10 per cent., all it would be necessary to do is to change as follows: 70 and 10 per cent., equal to 73 per cent., freight 15 per cent., equal to 58 per cent. laid down. The above rule or plan, however, would not, we think, apply to cost of goods by small dealers, where a few sizes of Butts or Hinges might be packed with sundry Hardware, but is more especially adapted for jobbers or large retail dealers, who buy the different lines of list goods at factory. We have pursued the foregoing plan on Screws, Hinges, Circular Saws, Files, Valves, Rubber and Leather Belting—in fact, all list goods—and have found it very satisfactory in arriving at cost of goods laid down in store.

**DAKOTA.**—Exact accuracy in finding cost of goods laid down in any store in the United States can and should be reached by every careful merchant. As to freights, they may be averaged on each invoice, but each article must be calculated by and for itself and freight added. We figure freights and drayage on each invoice, finding rate per cent. for all. Calculate exact cost of each article, or dozen or box, then add per cent. of freights. Our cost-mark represents cost on shelf. Usually in taking stock account, or annual or semi-annual invoice, we use cost-mark. If there is such an advance or decline in prices that warrants same, we estimate the rate per cent. of advance or decline, add to or deduct from invoice in bulk. Accuracy is attained by close, careful calculation. There is no royal or easy way among experienced accountants. Our freights here will not average over 7 or 8 per cent. on all kinds of goods. Where freights are over 10 per cent. they should be calculated on each article same as the items of merchandise, or just as the railroad companies calculate.

**PENNSYLVANIA.**—In our expense account every month we have itemized freights, boxing and carting, postage, road expense, stable, &c., so that by adding our month's purchases or year's purchases and the corresponding expense for freights and boxing and cartage charges we can get a percentage of cost to add to our inventory. Our percentage of cost here in the East is so very low that we do not add it to cost of goods only on Heavy Hardware. This method of marking would not do in the West where your correspondent writes from, as the freight becomes a very important item of actual cost.

**IOWA.**—Our system of marking goods is simple. We take original cost of goods as per original invoice, then add boxing, cartage and freight, and that is cost. When any change occurs we make such a change in our cost. For our wholesale department we use a cost-book, and figure and enter cost in the book at every change—viz., we buy an article which costs 60, 10 and 5 per cent. Supposing it lists at \$10 per dozen, the cost net would be \$3.42.

If it weighs 12 pounds, estimating box and all, and freight is \$1.30 per hundred pounds, cartage 5 cents per hundred, the net cost would be \$3.58, or a discount of 60 and 10, as near as could be figured. Supposing in course of time the original discount declines 5 per cent., we change cost to read 60 and 10 and 5 per cent., &c. In taking invoice we begin at one end of the house and take everything as we come to it, giving pounds, dozen, gross or feet. Then we copy in invoice-book, and having previously overhauled our prices in book we then adjust such prices, giving actual value of goods on date of invoice regardless of what the purchase cost was. We know of no other way to invoice our goods and actual value than to place the value on them at the time of taking stock. In the case of one invoice containing first, second, third and fourth class goods we invariably separate and figure them each according to their particular rate of freight. We shall read with much interest what your correspondents have to say.

**MINNESOTA.**—I mark the cost and retail price of shelf goods on each package. When the goods are unpacked I weigh the empty cases, deduct the amount from the weight on the expense bill, and the balance is the real net weight of the goods. Then I add the charges for cases and drayage to the amount of the expense bill. This gives me the exact cost of bringing the goods to my door. Dividing it with the weight gives me the rate per pound. I then weigh each article and add the freight. If there are goods of different freight rates in our invoice they have to be separated. On heavy goods the price is kept in a price-book, the freight and drayage added. These prices are changed and corrected according to the fluctuations of the market. If there is any important change in the price of shelf goods they are marked over. In this way I claim to be able to take quite a correct inventory. Adding a certain per cent. for the freight is not the correct way, as light goods cost frequently more than heavy, and as the freight is charged by weight it should be added by weight in marking goods.

### Exports.

PER BARK BANN, SEPTEMBER 6, 1889, FOR SYDNEY, N. S. W.

By *W. R. Cameron & Co.*—17 packages Buggies and Parts, 61 cases Handles, 5 bundles Sand-Paper, 13 cases Wagons, 200 Skewers, 1 box Couplings, 135 cases Horse-Nails, 2 cases Castings, 3 cases Tools, 14 packages Machinery, 3 crates Wheels, 2 cases Hardware, 1 Buggy, 1 cask and 1 barrel Blocks, 9 packages Carriages, 3 cases Castings, 50 tons Pig-Iron, 25 dozen Shovels, 24 dozen Handles, 400 Broom-Handles, 15 dozen Axes, 1 dozen Bush-Hooks, 4 dozen Emery-Wheels, 12 sets Stove-Fixtures, 9 packages Hardware, 14 dozen Saws, 10 dozen Hammers, 3 cases Hardware, 15 Meat-Choppers, 1/2 gross Squeezers, 2 crates Machinery, 8 dozen Hammers, 15 Lamps, 30 Guns, 1 case Tools and Primers, 20,000 Cartridges, 3 Scales, 1 bundle Hardware, 2 dozen Churns, 2 dozen Locks, 4 boxes Bolts and Nuts, 7 boxes Buggy, 2 boxes Castings, 1 box Hardware, 10 cases Axles, 6 boxes Bolts, 48 dozen Axle-Clips, 1 box Bolts and Nuts, 640 packages Nails, 4 bundles Iron Fittings, 14 dozen Saws, 5 boxes Hardware, 3 cases Hardware, 3 dozen Burners, 6 dozen Lanterns, 30 gross Lamp-Wicks, 2 dozen Safes, 3 cases Wire Goods, 6 1/2 dozen Shears, 13 dozen Razor-Straps, 12 dozen Hammers, 4 Chucks, 1 Spoke-Tenoning-Machine, 3 dozen Fasteners, 2 dozen Hardware, 7 Wrenches, 4 cases Nails, 6 crates Money-Drawers, 40 cases Blasting Cartridges, 1 case Cork-Pullers, 1 case Trucks, 2 cases Rollers.

By *H. W. Peabody & Co.*—30 gross Blacking, 31 packages Carriage-Ware, 12 dozen Blacking, 2023 pounds Barb-Wire, 11,200 pounds Barb-Wire, 2 Motors, 1 case Edge-Tools, 4 cases Bolts, 50 packages Hardware, 1 case Pumps, 9 Revolvers, 1 package Scrapers, 8 cases Granite-Ware, 36 packages Shellers, 6 barrels Stamped-Ware, 6 cases Hardware, 100 Razors, 7 barrels Shoe-Blacking, 4 packages Carriage-Ware, 5 packages Pumps, 9 cases Edge-Tools, 2 cases Sand-Paper, 1

case Type-Writers, 1 case Hubs, 1 case Stamped-Ware, 10 crates Shellers, 2000 pounds Nails, 2 cases Sand-Paper, 1 case Metal Fixtures and Trimmings.

By *W. H. Crossman & Bro.*—48 dozen Handles, 12 dozen Hoes, 6 dozen Burners, 10 cases Nails, 13 dozen Braces, 1/2 dozen Barrows, 1652 pounds Iron Bolts, 1/2 dozen Bolt-Clippers, 27 dozen Wash-Boards, 2 dozen Air Guns, 1500 pounds Staples, 1 dozen Wringers, 6 dozen Braces, 2 Pistols and 3000 Cartridges, 2 dozen Springs, 12 dozen Lanterns, 70 pounds Bolts, 9 Pumps, 1 Tire-Bender and Wheel, 14 packages Lawn-Mowers, 98 dozen Handles, 131 packages Carriage-Ware, 3 dozen Money-Drawers, 3 gross Pot-Cleaners, 21 reams Flint-Paper, 1 dozen Shellers, 7 1/2 dozen Fruit-Jars, 3 Drilling-Machines, 10 packages Hardware, 10 cases Hardware, 2 dozen Wringers, 1/2 dozen Shot-Cases, 1/2 dozen Revolvers, 25 dozen Wash-Boards, 12 dozen Reflectors, 12 dozen Reflectors, 30 Corn-Shellers, 1 1/2 dozen Wrenches, 2 1/2 dozen Churns, 6 dozen Handles, 2 gross Glue, 20 dozen Thermometers, 18 dozen Traps, 26 gross Wicks, 1 case Lamp Goods, 6 dozen Hatchets, 8 dozen Rakes, 20 dozen Handles, 1 dozen Hose-Reels, 4 boxes Hardware, 2 boxes Stove Parts, 6 cases Hardware, 6 dozen Traps, 10 dozen Axes, 245 pounds of Stone, 50 pounds Tacks, 1 1/2 dozen Wringers, 4 dozen Transom-Lights, 2 1/2 dozen Carbines, 2 dozen Money-Drawers, 20 dozen Axes, 24 dozen Handles, 10 dozen Axes, 5 dozen Bush-Hooks, 8 packages Hardware, 18 gross Wood-Screws, 2300 pounds Nails, 1000 feet Rubber Hose, 7 dozen Wrenches, 24 dozen Picks and Mattocks, 1 box Hardware, 14 cases Hardware, 6 packages Plated-Ware, 4 dozen Hammers, 1 dozen Adzes, 2 cases Plated-Ware, 70 pounds Nails, 2 1/2 dozen Hatchets, 8 dozen Axes, 25,000 Cartridges, 2 dozen Pistols, 4 dozen Hatchets, 1 1/2 dozen Churns, 116 dozen Handles, 4 dozen Hammers, 2 dozen Hoes, 2 dozen Steel-Yards, 12 gross Fruit-Jars, 20 packages Hardware, 46 cases School-Slates, 372 dozen Fruit-Jars, 8 Churns, 1/2 dozen Corn-Mills.

### REVIEW OF THE WHOLESALE MARKET IN PAINTS AND OILS.

*It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.*

#### Animal and Vegetable Oils.

The past week has witnessed but few changes in this branch of trade. Somewhat higher cost of Lard and inferior Greases has served to impart rather more tone to the market for Lard-Oil and lubricants generally, and some improvement is noticeable in the volume of business in that line. However, the movement is not found to have increased more than the advance of the fall season and the late backwardness of buyers' operations latterly would fully warrant, and the improvement in values is more in the realization of sellers' asking prices than in any actual advance on former quotations. Linseed-Oil manufacturers have received quite a considerable amount of domestic flaxseed from the West, but the cost is relatively so little below that of Calcutta seed that the value of the Oil, as based upon that of the crude material, is quite as high as it has been at any previous time during the past 30 days, and there is nothing in the situation of affairs at present pointing to reduced cost. The Cotton-Seed-Oil Trust and their allies adhere to the policy of imparting no information as to what is going on in their line, but, instead, attempt to belittle or controvert facts that come out from other quarters, probably for the reason that hard facts and stock-jobbing operations do not work harmoniously at the present time. Where actual business can be traced it is found that the prices obtained for the Oil rule relatively lower than the present cost of seed. Menhaden-Oils are no dearer than they were a week ago, but the reports from the fishing are to the effect that the catch has been poor the past ten days, and holders are firmer.





### New Ice-Creepers.

L. A. Sayre, Newark, N. J., is putting on the market the patterns of ice-creepers represented herewith, Figs. 1 and 2. It will be observed that these creepers are somewhat similar in construction, but are adapted for different uses. Fig. 1 represents the Jamestown, which is patented

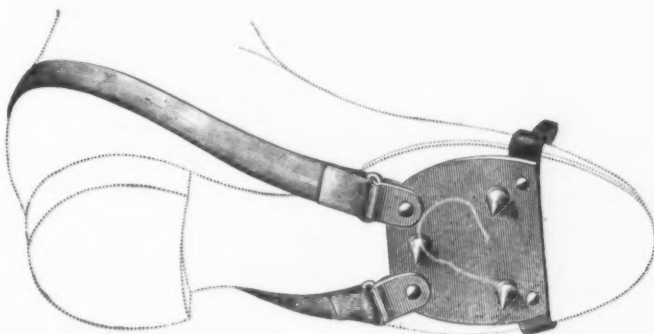


Fig. 1.—Jamestown Ice-Creeper.

by C. J. Lung, Jamestown, N. Y. The plate is made of galvanized iron and the points of hardened steel. There is a leather toe-strap and a rubber band which goes around the heel. Special attention is called to the flexible attachment, which is referred to as having advantages which are readily perceived. This creeper is made in two sizes, No. 1 for gentlemen,

on. The same bolt, nut and pin can be used any number of times, as it is not necessary to endeavor to strike the same place on the bolt with the pin. This nut-lock can be used on all kinds of machinery or in any place where a nut is liable to be loosened by jarring. With it a shorter bolt can be used than with other nut-locks. For railroad tracks the bolt can be  $\frac{1}{2}$  inch shorter



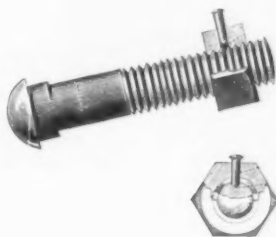
Fig. 2.—Hudson River Ice-Creeper.

which has four points, and No. 2 for ladies, which has three points. The latter is the one represented in the illustration. Fig. 2 represents the Hudson River Ice-Creeper, which embodies the principal features of construction possessed by the Jamestown, above described, but is made especially for ice-gatherers' use. It is furnished, as shown in cut, with straps long enough to pass back of the heel and buckle around the ankle. These leather straps take, it will be observed, the place of the rubber bands used in the Jamestown creeper. With these additions to his line the assortment of ice-creepers made by Mr. Sayre is exceptionally complete, eight different styles being put on the market.

### The Jenkins Nut-Lock.

A nut-lock of new and simple design, which is referred to as having proved very practical, is herewith illustrated. It consists merely of a case-hardened steel pin and a hole for the pin to pass through the

solid as when first put on. They have also been used on the Northwestern road at Janesville, Wis., with perfect success. The nut-lock is the invention of C. E. Jenkins, and is being put on the market by the Bower



The Jenkins Nut-Lock.

City Nut Lock Company, of Janesville, Wis., composed of C. E. Jenkins and A. P. Russell.

### The King Vise Cutting-Tool.

The King Vise Cutting-Tool, shown in the accompanying illustrations, is manufactured and put on the market by J. B. Hazelton, 250 Court street, Brooklyn, N. Y. Fig. 1 represents the tool itself, Fig. 2 showing the cutter in jaws of vise. This tool is intended for cutting wire, bolts, keys, rivets, &c., and will cut  $\frac{1}{4}$ -inch rods. The cutter-blocks slide on steel guide-rods and are held open by simple spiral springs. The cutting-edges

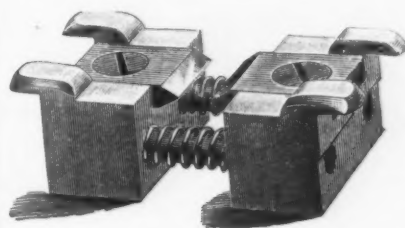


Fig. 1.—The King Vise Cutting-Tool

of the tool cannot be forced against each other, this feature being provided for in the determined length of the steel guide-rods projecting through the block and engaging the jaws of the vise, thus providing a positive stop. The length of this tool is  $3\frac{1}{4}$  inches and the width  $1\frac{1}{2}$  inches, the width of cutting-blades being  $\frac{3}{4}$  inch. The cut is made from both sides simultaneously and is referred to as being clean and without fin or ragged edge. The

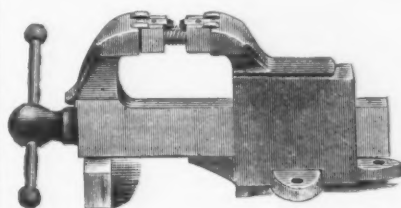
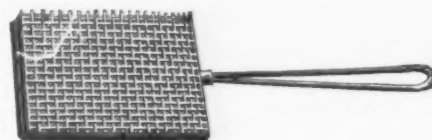


Fig. 2.—Cutting-Tool in Jaws of Vise.

tool is designed to rest in the open jaws of mechanics' vises, supported flush with face of vise by projecting lugs, as shown in Fig. 2. The cutting power of the contrivance is referred to as limited only by the capacity of the jaw and screw of vise employed. The parts are interchangeable and can be replaced when desired. The tool is described as made of the very best material and of superior finish. The tools are packed in boxes of half a dozen each and in cases of six dozen each.

### Sir Humphrey Davy Toaster.

The utensil shown herewith is manufactured by Silver & Co., 56 Warren street, New York. It is stated that it is the only

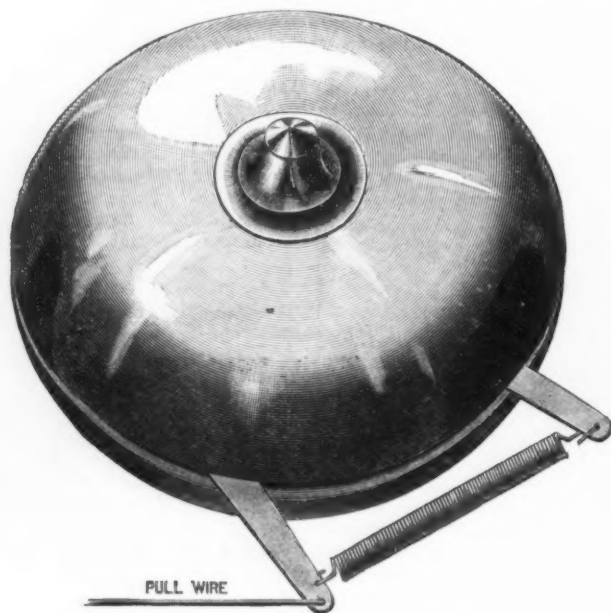


Sir Humphrey Davy Toaster.

toaster that can be used over the flame of a gas, gasoline or spirit stove. It consists of a coarse wire-netting, upon which the bread, meat or whatever is to be

toasted or broiled is placed, the lower frame being made of wire gauze. The latter, while permitting the heat to pass through, excludes the flame, thus preventing the burning of the article which is being toasted or broiled. The toaster is

the fact that it is self-winding, this being accomplished by ingenious mechanism. The company also manufacture two styles of corner-crank for use with these bells. In these cranks one arm is a little longer than the other, so that when the longer



*Distance Bell*

made in two sizes, 5 x 6 inches and 7 x 8 inches, the former being sold at \$2 25 per dozen and the latter at \$3 per dozen.

#### **Indestructible Door-Pull.**

The New Haven Wire Goods Company, New Haven, Conn., are putting on the market the article shown in the illustration.



*Indestructible Door-Pull.*

tion herewith given, which indicates clearly its form and construction. This door-pull is designed to take the place of the single wire ones and also of the old cast-iron door-pulls, its superior strength and beauty being alluded to. It will be perceived that it is made of two wires twisted together instead of a single wire, as in the case of other wire door-pulls. These goods are furnished japanned, bronzed, tinned, nickel and brass. They are packed quarter gross in a box, with screws, and the cost is referred to as being little above the price of the cheapest cast-iron pull. The company also make a drawer-pull in similar style of reduced size.

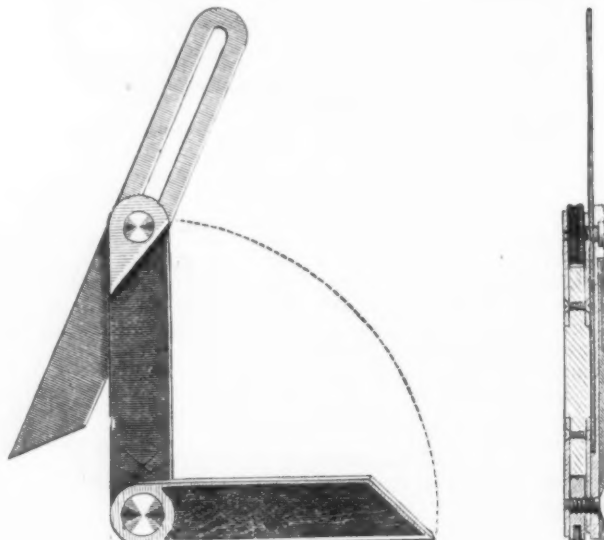
#### **Distance Bell.**

The latest addition to the line of bells manufactured by the New Departure Bell Company, Bristol, Conn., for whom John H. Graham & Co., 113 Chambers street, New York, are general agents, is represented in the accompanying illustration. The sound produced by this bell is similar to that of an electric bell. This bell can be placed over the door or in any part of the house where it can be connected with wires leading from as many doors as may be desired, and is operated by a bell-pull. The manufacturers call particular attention to

arm, to which the wire is attached, is placed toward the bell enough motion is gained to take up all the slack in the pull wire. The bell is made in one size, 4-inch, either bronze or nickel.

#### **Witter's Improved Flush Bevel.**

An interesting novelty which has recently been brought out by Frank E. Witter, of Willimantic, Conn., is shown in the accompanying illustrations. This is known as Witter's Newly-Improved Flush Bevel, and is a tool particularly useful in framing hips, valleys and jack-rafters, including other work where



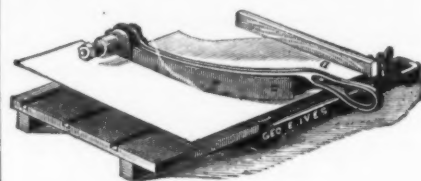
*Witter's Improved Flush Bevel.*

two blades are needed at one time. The tool is made of sheet-steel and brass, with wood center, and has two blades, one 10-inch sliding blade and one flush blade. It is handsomely finished, the steel portion being nickel-plated and the brass lacquered, while the wood center is

made of mahogany. At each end of the device are thumb-nuts, so placed as to be out of the way and yet convenient for use. In the edge of the thumb-nuts are two holes designed for the insertion of a nail-set to tighten the blade and hold it firmly in place when it is desired to use the same bevel for a long period. The flush blade is very useful in working from plans, as it rests flat on the table and can be tightened if necessary before raising it. Beneath the blade are gauge-marks, by means of which may be formed a square miter, octagon, hexagon and try-square, both right and left. The view at the right shows the tool in vertical cross section.

#### **The Elm City Metal-Cutter.**

This article, which is represented in the accompanying cut, is manufactured by George E. Ives, 379 State street, New



*The Elm City Metal-Cutter.*

Haven, Conn. The patent hinge joint used on this machine is especially referred to as permitting the cutting of any sized sheet of thin metal. The blades used are 12 inches in length, and are described as of the best quality, requiring but little grinding owing to the fact that they are constantly pressed together by the hinged spring. The machine is also adapted for cutting card-board, cloth, &c.

Work on the St. Louis Merchants' Bridge was officially inspected last week. The caisson in mid-stream has been sunk 41 feet, or within 9 feet of hard rock. The steel-work will embrace 6500 tons of metal, which is being turned out of the Union Bridge Company's shops at Athens,

Pa., and Buffalo, N. Y. The structure will lack the massive appearance of the Eads Bridge, but is being constructed according to more modern engineering designs, and is guaranteed by the engineers to stand a load 35 per cent. greater than that allowed upon the Eads Bridge.



**Perfection Self-Closing Cock.**

The H. A. Williams Mfg. Company, 22 Milk Street, Boston, Mass., manufacture and offer to the trade the Per-

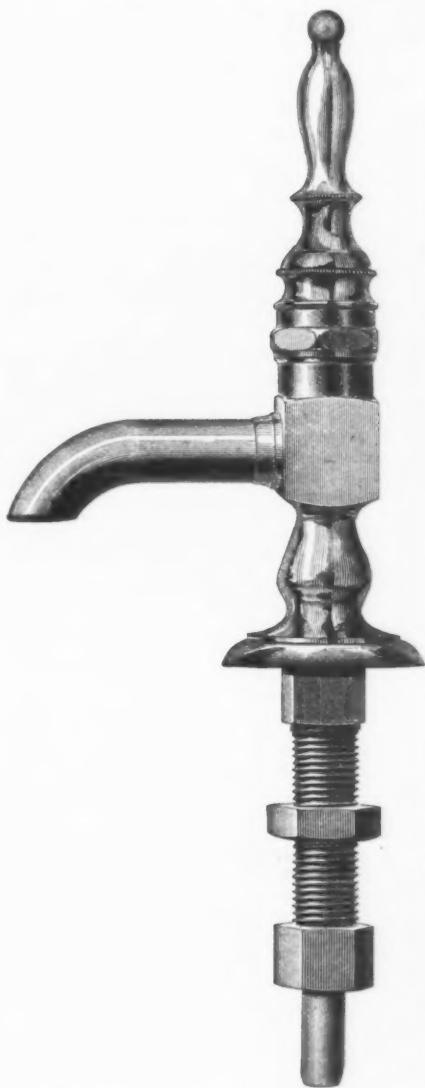


Fig. 1.—General View of Basin-Cock.

fection Self-Closing Cock, made in a variety of styles, sizes and finishes. The above firm have been in the plumbing

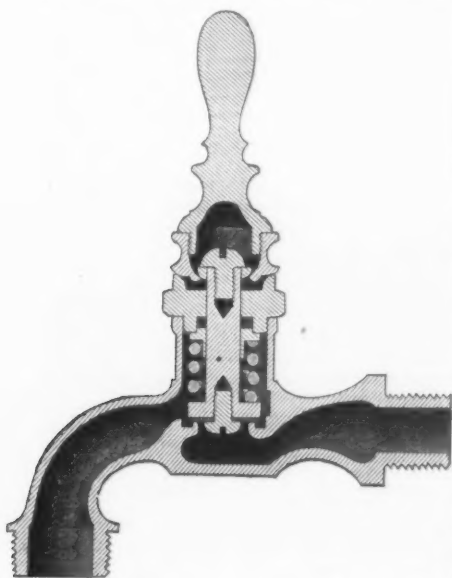


Fig. 2.—Sectional View of Hose-Bibb.

business a long while, and refer to the Perfection Self-Closing Faucet as the outcome of their extensive experience. The entire body of these faucets is made of the

best No. 1 valve metal, and in shape the faucets are a departure from the conventional type. The valve shown in the sectional cut, Fig. 2, is faced with Jenkins' best packing and the gland or stuffing box through which the valve stem operates is filled with a solid block of felt, soaked with tallow, which is constantly crowded against the stem by the combined action of the spring and cup-shape ring or thimble, the result being, it is said, a durable and water-tight joint. The manufacturers specially note the fact that these faucets are provided with means for taking up the wear and looseness of cams arising from continued use, this being secured by a simple device which allows the ball on the top of the stem to be moved up and down as the case may require. It will be seen by referring to the sectional view that the wear on the surface is evenly distributed over a large surface and not concentrated upon any single point. In the Perfection cocks the lift of the valves is in a perfectly straight line and the valve rises instantly in whatever direction the lever is moved. On account of these features the manufacturers allude to it as an exceptionally sensitive faucet. The goods are made in all styles, basin-cocks, hose-bibbs, plain bibbs for both lead and iron pipe, urinal-cocks, &c. In the accompanying illustrations, Fig. 1 shows a general view of the Perfection Self-Closing Basin-Cock, while Fig. 2 is a sectional view of the Perfection Hose-bibb.

**Columbus Door-Bell.**

The Columbus Door-Bell Company, of Columbus, Ohio, have placed upon the market a door-bell known under the name

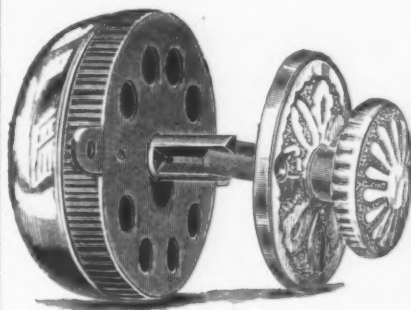


Fig. 1.—Columbus Door-Bell.—View of Knob Bell.

Columbus, a general idea of the construction of which may be gained from an inspection of the accompanying illustrations. This bell is made in two sizes, having

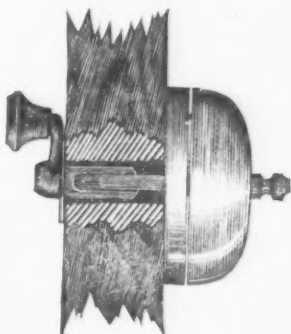


Fig. 2.—Crank Bell.

nickel-plated gong and japanned metal base. At the present time two varieties are offered, known respectively as the crank and knob bells. In both cases the principle of operation is the same, the sound being produced by a rotary motion of what may be designated as the handle. Fig. 1 shows the knob bell, while Fig. 2 represents the crank bell. The crank or

operating-lever is inserted in the tumbler projecting from the inner face of the bell. This is operated by a ratchet, to which is attached the striker. The bells are made of few parts, of simple construction, and of such a nature as to render them little liable to get out of order. The best material is employed in their construction, and they are offered, as stated above, in two sizes, 3 and 4 inch.

**The Prescott Door-Hanger.**

Since the illustrated description of Prescott's Trackless Door-Hanger was published some seven years ago, the

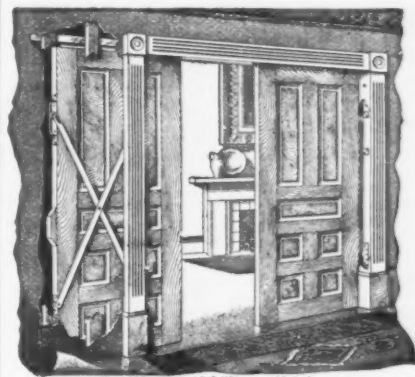


Fig. 1.—Prescott's Parlor-Door Hanger.

Prescott Hardware Mfg. Company, of 108 and 110 Randolph street, Chicago, Ill., have made a number of improvements in the device which cannot fail to be appreciated by the building trade generally. In the accompanying illustrations we show two applications of this door-hanger, the arrangement being so clearly indicated as to call for very little explanation. The Prescott hanger supports a door on the principle of the ordinary swinging door hung upon hinges. In this case no track is employed, the hanger being applied to

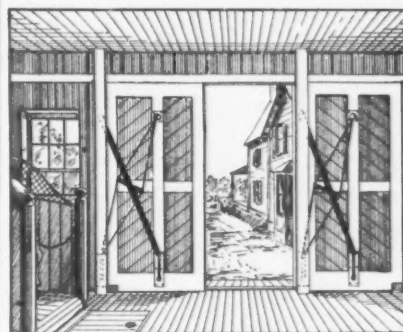


Fig. 2.—Prescott's Barn-Door Hanger.

the jamb on one side of the sliding door, after the plaster is completed and the interior finish in place. The hanger is secured to the jamb and covered by a wide stop. The manufacturers claim that it can be adjusted by taking off the stop and altering the set of the hanger. The hanger works in a pocket at one side of the door and does not show. It is warranted not to get out of order with constant use. In Fig. 1 of the illustrations a hanger is shown applied to folding doors, the plastering being broken away at the left of the cut in order to clearly indicate the general arrangement. In Fig. 2 the Prescott Trackless Door-Hanger is shown in its application to barn doors. The statement is made that the almost total absence of friction makes the largest doors run easily, and that the doors cannot jump nor get off the track, as none is employed. They are well constructed and have already established a wide reputation in the trade.

Southern Freight Rates.

We print below the table of rates on pig-iron which went into effect on the 1st of October from points in Alabama and Tennessee to Central Pennsylvania and New York. The rates are those made by the East Tennessee, Virginia and Georgia Railroad via Bristol, Roanoke and Hagerstown, per ton of 2268 pounds:

ject that it will be but a short time before there will be American lines communicating with all the ports south of us.

The Largest Draw-Bridge.

The Shore Line Railway bridge at New London, the largest swing-span draw-bridge in the world, is now in position. It

to the Thames naval station further up the river. This great bridge, 1422 feet long, crosses the Pequot River (imitatively named by the first settlers the Tlames, while they, quite as foolishly, named Pequot New London) from a point at the terminus of the Yale-Harvard regatta course at Winthrop's Point, at the upper part of the town.

We are informed that the aggregate sales of pig-iron on warrants thus far are equal to about 35,000 tons. Since, however, the greater part of this iron is yet to be made, embracing chiefly December delivery, and some later, the actual aggregate of warrants issued is about 8000 tons. It is stated that at least one furnace in the South, soon to blow in, will run entirely on warrant iron, and that others are contemplating similar action.

To	From					
	Chattanooga, Tenn.	Hermitage, Ettn, Ga.; Tecumseh, Rock Run, Anniston, Columbiana, Brierfield, Ironatons, Jenifer, Ala.	Florence, Sheffield, Ala.	Birmingham, Bessemer, Ensley, Woodward, Thomas, North Birmingham, Ala.	Atalla, Gadsden, Ala.	Rockwood, Dayton, Tenn.
Chambersburg, Pa.	\$3.07	\$3.57	\$3.67	\$3.57	\$3.57	\$3.22
Hagerstown, Md.; Carlisle, Waynesboro, Harrisburg, Pa.	3.11	3.61	3.71	3.61	3.61	3.26
Middletown, Maysville (Midland Division), Duncannon, Pa.	3.26	3.76	3.86	3.76	3.76	3.41
Millersburg, York, Safe Harbor, Columbia, Pa.	3.42	3.92	4.02	3.92	3.92	3.57
Lancaster, Mifflin, Sunbury, Pa.	3.56	4.06	4.16	4.06	4.06	3.71
Parkersburg, Thorndale, Downingtown, Northumberland, Milton, Logan, Coatesville, Pa.	3.71	4.21	4.31	4.21	4.21	3.86
Phoenixville, Huntingdon, Muncy, Watsonstown, Pa.	3.87	4.37	4.47	4.37	4.37	4.02
Tyrone, Williamsport, Pottstown, Reading, Nanticoke, Tomhicken, Germantown Junction, Conshohocken, Norristown, Birdsboro, Hazleton, Pa.	4.02	4.52	4.62	4.52	4.52	4.17
Lock Haven, Altoona, Wilkesbarre, Pa. Bellefonte, Hamburg, Phillipsburg (Tyrone Division Pennsylvania Railroad), Pa.	4.17	4.67	4.77	4.67	4.67	4.32
Danville, Pa.	4.32	4.82	4.92	4.82	4.82	4.47
Scranton, Pa.	3.96	4.16	4.56	4.46	4.46	4.11
Freemansburg, Pa.	4.52	5.02	5.12	5.02	5.02	4.67
Woodbury, N. J.	4.85	5.35	5.45	5.35	5.35	5.00
Bloomsburg, Pa.	4.32	4.82	4.92	4.82	4.82	4.47
Syracuse, Rochester, Utica, Auburn, Seneca Falls, N. Y.	4.22	4.72	4.82	4.72	4.72	4.37
Bethlehem, Pa.	5.13	5.63	5.73	5.63	5.63	5.28
Sayre, Pa.	4.33	4.83	4.93	4.83	4.83	4.48
Fullerton, Pa.	4.79	5.29	5.39	5.29	5.29	4.94
Berwick, Pa.	4.33	4.83	4.93	4.83	4.83	4.48
Cumberland, Md.	4.22	4.72	4.82	4.72	4.72	4.37
Perryville, Pa.	4.10	4.60	4.70	4.60	4.60	4.25
Hanover, Pa.	3.71	4.21	4.31	4.21	4.21	4.86
Blandon, Pa.	3.56	4.06	4.16	4.06	4.06	3.71
Via Bristol, Roanoke and Shen. Junction:	4.09	4.59	4.69	4.59	4.59	4.24
Johnstown, Pa.	4.10	4.60	4.70	4.60	4.60	4.25
Bessemer, Pa.	4.10	4.60	4.70	4.60	4.60	4.25

The rates in the above table are carloads, 17½ tons minimum. So far as we know these rates have never before appeared in the public prints. Taking the Cincinnati market as the principal one for Southern irons and deducting the freight rate to that point, the price at furnace may be reached. With that as the basis consumers can themselves figure out the equivalent at their own locality.

During the year ending March 31, 1889, 862 miles of railroad were built in India, increasing the total mileage to 15,245 miles. The cost of the roads was about \$13,000 per mile and the net profits have always been above 5 per cent.

The Ward Steamship Company, of this city, are building three fine steam-ships for the trade. The president of the company says: "We would have made much more money by chartering English instead of building American ships, but I have always maintained the idea of keeping American shipping in American vessels.

We are going right on building more ships, and our plans are for vessels larger than for any we have now got." He expects when Congress takes up the sub-

ject that it will be but a short time before there will be American lines communicating with all the ports south of us. was built parallel to the shore along the fender pier, so as not to obstruct navigation, and has been swung into place. It is of solid steel, weighs nearly 2,500,000 pounds, and its connecting parts when the bridge was swung into position shot into the mortises of the bridge proper with absolute precision. This was a great relief for the anxious engineers. Some of the highest engineering skill ever employed in bridge-building has been used in the construction of this bridge, the situation involving peculiar difficulties. In some places 56 feet of water and 80 feet of mud were found where the piers must be set. There great timber curbs were constructed and sunk to the total depth of 137 feet. After scooping out the interior mud the curbs were driven full of piles. These, cut off at a level midway in the curbs, were bound solidly together by filling the spaces with concrete. On this rock-like basis the masonry of the pier was built up. The center pier is an immense structure 71 feet square. It is flanked on either side by spans of 310 feet, and there are two other spans at either side of the river of 150 feet each. The unusual length of draw was required by the United States Government that there should be no obstruction to the passage of the naval fleet

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# CURRENT HARDWARE PRICES.

OCTOBER 2, 1889.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

## Ammunition.

Caps, Percussion, 1000—

Hicks & Goldmark's and Union Metallic Cartridge Co.	
F. L. Waterproof, 1-10's	34@35¢
E. B. Trimmer Edge, 1-10's	40@45¢
E. B. Grnd. Edge, Cent. Fire, 1-10's	40@47¢
Musket Waterproof, 1-10's	50¢
G. D.	28¢
S. B. Genuine Imported	45¢
Eley's E. B.	54¢ @ 55¢
Eley's D Waterproof, Central Fire	\$1.60

Cartridges.

Rim Fire Cartridges	50¢5¢2¢
Rim Fire Military	15¢2¢
Cent. Fire, Pistol and Rifle	25¢5¢2¢
Cent. Fire, Military and Sporting	15¢5¢2¢
Blank Cartridges, except 22 and 32 cal., additional 10% on above discounts.	
Blank Cartridges, 22 cal.	\$1.75
Blank Cartridges, 32 cal.	\$3.50
Primed Shells and Bullets	15¢5¢2¢
B. B. Caps, Round Ball, \$1.75	2¢
B. B. Caps, Con. Ball, Swgd., \$2.00	2¢

Primers—

Berdan Primers, \$1.00	2¢
B. L. Caps (for Sturtevant Shells) \$1.00	2¢
All other Primers, \$1.20	2¢

Shells—

First quality, 4, 8, 10 and 12 gauge	25¢10¢2¢
First quality, 14, 16 and 20 gauge (\$10 list)	30¢10¢2¢
Star, Club, Rival and Climax brands	20¢10¢2¢
Seibold's Comb. Shot Shells	15¢2¢
Brass Shot Shells, 1st quality	60¢2¢
Brass Shot Shells, Club, Rival, Climax	65¢2¢
I. X. L. 10 and 12 gauge	40¢5¢2¢
"Special," 16 gauge	30¢10¢5¢2¢
"Special," 10 and 12 gauge	40¢10¢2¢
Fowler's Pat.	\$3.25

Shells Loaded—

Standard. List	40¢10¢40¢10¢10¢
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Wads—

U. M. C. & W. R. A.—B. E., 11 up.	\$2.00
U. M. C. & W. R. A.—B. E., 9&10	2.30
U. M. C. & W. R. A.—B. E., 7&8	2.60
U. M. C. & W. R. A.—P. E., 11 up.	3.10
U. M. C. & W. R. A.—P. E., 9&10	4.00
U. M. C. & W. R. A.—P. E., 7&8	4.90
Eley's B. E., 11 up.	\$1.75
Eley's P. E., 11 up.	2.80

Anvils—

Eagle Anvil, 10¢ 10¢	20¢20¢5¢
Peter Wright's	9¢4¢9¢4¢
Armstrong's Mouse Hole	8¢4¢
Armstrong's Mouse Hole, Extra	11¢4¢
Trenton	9¢4¢9¢
Wilkinson's	9¢4¢10¢
J. & Riley Carr, Pat. Solid	11¢11¢4¢
Moore & Barnes Mfg. Co.	33¢1¢

Anvil Vise and Drill—

Millers Falls Co., \$18.00	20¢
Cheney Anvil and Vise	25¢
Allen Anvil and Vise, \$3.00	40¢10¢

Apple Purers—

Advance	¢ doz \$4.75
Antimom Combs	¢ doz 5.25
Baldwin	¢ doz 5.25
Champion	¢ doz 7.25
Daisy	¢ doz 4.00
Eureka, 1888	each 17.00
Family Bay State	¢ doz 12.00
Favorite	¢ doz 5.00
Gem	¢ doz 4.00
Gold Medal	¢ doz 4.00
Ideal	¢ doz 4.00
Improved Bay State	¢ doz 30.00
Little Star	¢ doz 4.50
Monarch	¢ doz 13.50
New Lightning	¢ doz 5.50
Oriole	¢ doz 4.00
Penn.	¢ doz 4.00
Perfection	¢ doz 4.00
Pomona	¢ doz 4.00
Rocking Table	¢ doz 6.00
Turntable	¢ doz 4.50
Victor	¢ doz 13.50
Waverly	¢ doz 4.00
White Mountain	¢ doz 4.50
72	¢ doz 4.25
76	¢ doz 4.75
78	¢ doz 6.50

Augers and Bits—

Douglass Mfg. Co.	
Wm. A. Ives & Co.	
Humphreysville Mfg. Co.	70¢
French, Swift & Co. (F. H. Beecher, Rockford Bit Company)	
Cook's, Douglass Mfg. Co.	55¢
Cook's, N. H. Copper Co. 50¢10¢50¢10¢5¢	
Ives' Circular Tap	60¢
Patent Solid Hole Augers and Bits	35¢
C. E. Jennings & Co., No. 10, extension	40¢
up	40¢
C. E. Jennings & Co., No. 30	60¢
C. E. Jennings & Co., Auger Bits, 1/2 set, 82¢ quarters, No. 5, 85¢; No. 30, \$3.50, 20¢	
Russell Jennings' Augers and Bits	45¢
Imitation Jennings' Bits	60¢60¢5¢
Pugh's Black	30¢
Rockford, Jennings' Pattern	60¢
Car Bits	50¢10¢60¢
L. Hommedieu Car Bits	15¢10¢
Forstner Pat. Auger Bits	10¢

Hollow Augers—

Ives'	
French, Swift & Co.	33 1/2¢ @ 33 1/2¢10¢
Douglass'	
Bonney's Adjustable, 1/2 doz \$4.85	40¢10¢
Stearns'	20¢10¢
Ives' Expansive, each \$4.50	50¢5¢
Universal Expansive, each \$4.50	20¢
Wood's	25¢25¢10¢
Cincinnati Adjustable	30¢30¢5¢
Cincinnati Standard	25¢10¢

Expansive Bits—

Clarks' small, \$18; large, \$20	35¢35¢5¢
Ives' No. 4, 1/2 doz \$60	40¢
See	25¢25¢5¢
Swan's	40¢
Steer's No. 1, \$26; No. 2, \$22	35¢
Stearns' No. 2, \$48	20¢

Gimlet Bits—

Common	¢ gross \$2.75 @ \$3.25
Diamond	¢ doz \$1.10
See	25¢10¢5¢
Double Cut, Sheppard's	45¢45¢10¢
Double Cut, Ct. Valley Mfg. Co.	30¢10¢
Double Cut, Hartwell's, 1/2 gro.	\$5.25
Double Cut, Douglass'	40¢10¢
Double Cut, Ives'	60¢60¢10¢

Bit Stock Drills—

Morse Twist Drills	50¢10¢5¢
Standard	50¢10¢5¢
Cleveland	50¢10¢5¢
Syracuse, for metal	50¢10¢
Syracuse, for wood (wood list)	30¢30¢5¢
Williams' or Holt's, for metal	50¢10¢
Williams' or Holt's, for wood	40¢10¢

Ship Augers and Bits—

L'Hommiedieu's	15¢10¢15¢10¢5¢
Watrous'	15¢10¢15¢10¢10¢
Snell's	15¢10¢15¢10¢5¢
Snell's Ship Auger Pat'n Car Bits	15¢10¢15¢10¢5¢

Awl Hafts—

Sewing, Brass Fer. 1/2 gr.	\$3.50
Pat. Sewing, Short, 1/2 doz.	40¢10¢
Pat. Sewing, Long	40¢10¢
Pat. Peg, Plain Top, 1/2 gr.	\$10.00
Pat. Peg, Leather Top, 1/2 gr.	\$12.00

Awls, Brad Sets, &amp;c—

Awls, Sewing, Common	1/2 gr \$1.70, 35¢
Awls, Should. Peg, 1/2 gr	\$2.45, 40¢40¢10¢
Awls, Flat, Peg, 1/2 gr	35¢
Awls, Shouldered Brad	2.70 gr 35¢
Awls, Handled Brad	\$7.50 gr 45¢
Awls, Handled Scratch 1/2 gr	\$7.50, 35¢10¢
Awls, Socket Scratch, 1/2 doz	\$1.50, 25¢30¢

Awl and Tool Sets—

Aiken's Sets, Awls and Tools	
No. 20, 1/2 doz \$10.00	55¢10¢
Pray's Adj. Tool Hds., Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9.	25¢25¢10¢
Miller's Falls Adj. Tool Hds.	
No. 1, \$12; 2, \$18	25¢
Henry's Combination Haft, 1/2 doz \$6.50	
Brad Sets	
No. 42, \$10.50; No. 43, \$12.50, 70¢10¢5¢	
Stanley's Excelsior	
No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50	30¢10¢

Axes—

Makers' and Special Brands—

First quality	¢ doz \$8.00 @ \$6.50
Others	¢ doz \$5.50 @ \$5.75

Axle Grease—

Fraser's	Keg 1/2 doz, 1/2 doz 5¢
Fraser's, in boxes	1/2 doz \$8.50
Fraser's Everlasting, in boxes	1/2 doz 1¢
Dixon's Everlasting	10¢10¢2¢ 8¢
Lower grades, special brands	1/2 gr \$5.50 @ \$7.00

Axles—

No. 1	4¢4¢1/2¢, No. 2 5¢4¢5¢
Nos. 7 to 14	55¢5¢
Nos. 15 to 18	47¢
Nos. 19 to 22	70¢
National Tubular Self-Oiling Standard Farm (1 to 5) and Special Farm (A1 to A5)	
Less than 10 sets	33¢5¢
Over 10 sets	33¢5¢

Bag Holders—

Sprenkle's Pat.	1/2 doz \$18
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Balances—

Spring Balances	50¢
Common 24" 1/2 doz	\$1.50
Chattillon's Spring Balances	50¢
Chattillon's Circular Spring Balances	60¢

Bells—

Hand—

Light Brass	70¢10¢ @ 75¢
Extra Heavy	60¢10¢
White Metal	60¢10¢10¢
Silver Chime	35¢10¢
Globe (Cone's Patent)	25¢10¢35¢

Door—

Gong, Abbe's	35¢10¢
Gong, Yankee	45¢
Gong, Barton's	40¢10¢50¢
Crank, Taylor's	25¢10¢
Crank Brooks	60¢10¢2¢
Crank, Cone's	10¢

Crank, Connel's	20¢10¢
Lever, Sargent's	60¢10¢
Lever, Taylor's Hrouzed or Plated	25¢10¢
Lever, Taylor's Japanned	25¢10¢
Lever, R. E. M. Co.'s	50¢10¢2¢
Pull, Brook's	50¢10¢2¢
Pull, Western	25¢10¢

Cone—

Common Wrought	60¢10¢
Western	20¢10¢
Western, Sargent's list	70¢10¢
Kentucky, "Star"	20¢10¢
Kentucky, Sargent's list	70¢10¢
Dodge, Genuine Kentucky	70¢10¢10¢
Texas Star	50¢10¢50¢10¢5¢
Call	1/2 doz 3¢4¢
Farm Bells	1/2 doz 3¢4¢
Steel Alloy Church and School Bells	40¢

Bellows—

Blacksmiths'	60¢60¢5¢
Molders'	40¢40¢10¢
Hand Bellows	40¢10¢50¢

Belting, Rubber—

Common Standard	70¢10¢
Standard	70¢70¢5¢
Extra	60¢5¢60¢10¢
N. Y. B. & P. Co., Carbon	60¢10¢5¢
N. Y. B. & P. Co., Diamond	50¢10¢

Bench Stops—

Morrill's	1/2 doz \$9, 50¢
Hotchkiss's	1/2 doz \$5, 10¢10¢10¢
Weston's No. 1, \$10; No. 2, \$9.25	10¢5¢
McGill's	1/2 doz \$3
Cincinnati	25¢10¢

Bits—

Auger, Gimlet, Bit Stock, Drills, &c., see Augers and Bits.	
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Bit Holders—

Extension	
Barber's, 1/2 doz \$15.00	40¢40¢10¢
Ives, 1/2 doz \$20.00	60¢5¢60¢10¢
Diagonal	1/2 doz \$24.00, 40¢
Angular	1/2 doz \$24.00, 40¢5¢

Blind Adjusters—

Domestic	1/2 doz \$3.00, 33¢4¢
Excelsior	1/2 doz \$10.00, 50¢10¢2¢
Washburn's Self-Locking	20¢20¢10¢

Blind Fasteners—

Mackrell's, 1/2 doz \$1.00	20¢20¢10¢
Van Sand's Screw Pat., \$15 1/2 gr.	60¢10¢
Van Sand's Old Pat., \$15.00, 1/2 gr.	55¢10¢
Washburn's Old Pattern, 1/2 gr.	\$9.00
Merriman's	new list
Austin & Eddy No. 2008, 1/2 gr.	\$9.00
Security Gravity, 1/2 gr.	\$9.00

Blind Staples—

Barbed, 1/2 in. and larger	1/2 doz 7¢8¢
Barbed, 3/4 in.	1/2 doz 8¢9¢

Blocks—

Ordinary Tackle, list May 20, 1889	50¢
Cleveland Block Co., Mal. Iron	50¢
Moore's Novelty, Mal. Iron	50¢

Bolts—

Door and Shutter—

Cast Iron Barrel, Square, &c.	70¢70¢10¢
Cast Iron Shutter Bolts	70¢70¢10¢
Cast Iron Chain (Sargent's list)	65¢10¢
Ives' Patent Door Bolts	60¢
Wrought Barrel	70¢70¢10¢
Wrought Square	70¢70¢10¢
Wrt Shutter, all Iron, Stanley's	60¢10¢
Wrt Shutter, Brass Knob	40¢10¢
Wrt Shutter, Sargent's list	60¢10¢
Wrt Sunk Flush, Sargent's list	55¢10¢
Wrt Sunk Flush, Stanley's list	50¢10¢
Wrt B.K. Flush, Com'n	55¢10¢

Carriage, Machine, &amp;c.—

Com. list June 10, '84	75¢75¢2¢
Genuine Eagle, list Oct. '84	75¢10¢80¢
Phila. pattern, list Oct. '84	80¢80¢10¢
R.B. & W., old list	70¢
Machine, according to size	75¢10¢80¢
Bolt Ends, according to size	75¢10¢80¢

Fire—

Common, list Feb. 28, '83	70¢
Port Chester Bolt and Nut Company	
Empire, list Feb. 28, '83	70¢
Phila., list Oct. '84	82¢5¢
Keystone, Philadel., list Oct. '84	80¢
Norway, Phila., list Oct. '84	75¢10¢
American Screw Company	
Norway, Phila., list Oct. 16, '84	75¢10¢
Eagle, Phila., list Oct. 16, '84	80¢
Phila., list Oct. 16, '84	82¢5¢
Bay State, list Feb. 28, '83	70¢
R.B. & W., Philadel., list Oct. 16, '84	82¢5¢

Stove and Plow—

Stove	65¢
Plow	60¢5¢
R. B. & W., Plow	55¢
	1/2 doz 9¢10¢10¢

Boring Machines—

Without Augers	
Douglas	\$5.50 \$8.75
Snell's, Rice's Pat. 5.50	6.75, 40¢10¢10¢
Jennings	5.50 6.75, 45¢45¢10¢
Other Machines	2.35 2.75
Phillips' Patent	
with Augers	00 7.50

Bow Pins—

Humason, Beckley & Co.'s	60¢10¢
Sargent & Co.'s, \$17 and \$18	60¢10¢
Peck, Stow & W. Co.	50¢10¢50¢10¢5¢

Braces—

Barber's	
Nos. 10 to 16	50¢
Nos. 30 to 33	50¢
Nos. 40 to 63	50¢10¢
Barker's	
Nos. 8, 10 and 12	75¢10¢80¢
Plated, Nos. 8, 10 and 12	65¢10¢70¢
Osgood's Ratchet	40¢10¢50¢
Spofford's	50¢5¢50¢10¢
Ives' New Haven Novelty	70¢70¢5¢
New Haven Ratchet	60¢5¢60¢10¢
Barber Ratchet	60¢5¢60¢10¢
Barbers	60¢5¢
Spofford's	60¢5¢60¢10¢
Common U. S. American	\$1.00¢\$1.10
Cartholomew's	
Nos. 25, 27 and 30	50¢10¢60¢5¢
Nos. 117, 118, 119	70¢70¢5¢
Amidon's	
Barber's Imp'd Plaine	75¢10¢70¢
Barker's Imp. Nickel	65¢10¢80¢
Ratchet	75¢10¢80¢
Eclipse Ratchet	60¢
Globe Jawed	40¢40¢10¢
Corner Brace	40¢40¢10¢
Patent, 8 in. \$2.10 10 in.	40¢40¢10¢
Buffalo Ball	\$1.00¢\$1.15
S. & W	50¢10¢

**Cards—**

Horse & Curry.....10&10@10&10&10  
 Cotton.....10&10@10  
 Wool.....10&10@10

**Carpet Stretchers—**

Cast Steel, Polished.....\$ doz \$2.25  
 Cast Iron, Steel Points.....\$ doz 80¢  
 Socket.....\$ doz \$1.75  
 Bullard's.....25¢ doz \$10

**Carpet Sweepers—**

Bissell No. 5.....\$ doz \$17.00  
 Bissell No. 7 New Drop Pan.....\$ doz \$19.00  
 Bissell, Grand.....\$ doz \$36.00  
 Grand Rapids.....\$ doz \$24.00  
 Crown Jewel, No. 1, No. 2, No. 3.....\$19.00; No. 3, \$20.00

Magic.....\$ doz \$15.00  
 Jewel.....\$ doz \$17.00

Improved Parlor Queen.....\$ doz \$27.00  
 Nickle.....\$ doz \$24.00  
 Japanned.....\$ doz \$22.00

Excelsior.....\$ doz \$18.00  
 Garland.....\$ doz \$24.00  
 Parlor Queen.....\$ doz \$18.00

Housewife's Delight.....\$ doz \$15.00  
 Queen.....\$ doz \$16.00  
 Queen, with band.....\$ doz \$30.00

King.....\$ doz \$18.00  
 Weed, Improved.....\$ doz \$16.00  
 Hub.....\$ doz \$16.00

Cog-Wheel.....\$ doz \$22.00  
 Conqueror.....\$ doz \$22.00  
 Easy.....\$ doz \$22.00

Monarch.....\$ doz \$21.00  
 Goshen.....\$ doz \$18.00  
 Advance.....\$ doz \$15.00

Ladies' Friend, No. 1, No. 2.....\$ doz \$16.00  
 American.....\$ doz \$15.00  
 Grand Republic.....\$ doz \$35.00

**Cartridges—**

See Ammunition.

**Casters—**

Bed.....Brass.....55¢ doz \$17.50  
 Plate.....Others.....60¢ doz \$18.00  
 Shallow Socket.....40¢ doz \$10.00

Deep Socket.....40¢ doz \$10.00  
 Yale Casters, list May, 1888.....30¢ doz \$9.00  
 Yale, Gem.....60¢ doz \$12.00

Martin's Patent (Phoenix).....45¢ doz \$10.50  
 Payson's Anti-Friction.....60¢ doz \$12.00  
 Giant Truck Casters.....30¢ doz \$9.00

Stationary Truck Casters.....50¢ doz \$10.00  
 Socket Truck Casters.....50¢ doz \$10.00

**Cattle Leaders—**

Humason, Beckley & Co.'s.....70¢ doz \$21.00  
 Sargent's.....60¢ doz \$18.00  
 Hotchkiss.....30¢ doz \$9.00

Peck, Stow & W. Co.'s.....50¢ doz \$10.00

**Chain—**

Trace, 6-10-2, exact.....50¢ doz \$10.00  
 Trace, 6-10-3, exact.....50¢ doz \$10.00  
 Trace, 6-10-4, exact.....50¢ doz \$10.00

Trace, 7-10-2, exact.....50¢ doz \$10.00  
 Trace, 7-10-3, exact.....50¢ doz \$10.00  
 Trace, 7-10-4, exact.....50¢ doz \$10.00

NOTE.—Traces, "Regular" sizes, 3¢ net  
 pair less than exact.

Log Fifth, Stretcher, and other fancy  
 Chains, list Nov. 1, 1888.....50¢ doz \$10.00

American Coil, in case lots.....50¢ doz \$10.00  
 3-16 1/4 5-16 3/4 7-16 1/2 5 3/4  
 \$8.25 5.75 5.00 4.00 3.75 3.00 3.50 3.40

Less than case lots, add 1/4¢ doz \$10.00  
 German Coil, list of June 20, 1887.....50¢ doz \$10.00

German Halter Chain, list of June 20, 1887.....50¢ doz \$10.00  
 Covert Halter.....50¢ doz \$10.00  
 Covert Traces.....35¢ doz \$10.50

Onelida Halter Chain.....60¢ doz \$12.00  
 Galvanized Pump Chain.....\$1.50 doz \$15.00  
 Jack Chain, Iron.....75¢ doz \$7.50

Jack Chain, Brass.....70¢ doz \$7.00

**Chalk—**

White.....\$ gr 50¢  
 Red.....\$ gr 70¢  
 Blue.....\$ gr 85¢

See also Crayons.

**Chalk Lines—**

See Lines.

**Chisels—**

Socket Framing and Firmer.

P. S. & W.....75¢ doz \$7.50  
 New Haven.....75¢ doz \$7.50  
 Witherby.....75¢ doz \$7.50

Mix.....75¢ doz \$7.50  
 Ohio Tool Co.....75¢ doz \$7.50  
 Douglas.....75¢ doz \$7.50

Buck Bros.....75¢ doz \$7.50  
 Merrill.....75¢ doz \$7.50  
 L. & J. J. White.....75¢ doz \$7.50

Tanged and Miscellaneous.

Tanged Firmer.....40¢ doz \$4.00  
 Butcher's.....40¢ doz \$4.00  
 Spear & Jackson's.....40¢ doz \$4.00

Buck Bros.....40¢ doz \$4.00  
 Cold Chisels, \$ 10.....10¢ doz \$1.00

**Chucks—**

Beach Pat.....each \$8.00, 20¢ doz \$16.00

Morse's Adjustable, each \$7.00, 20¢ doz \$14.00

Danbury.....each \$6.00, 30¢ doz \$18.00

Syracuse, Balz Pat.....25¢ doz \$2.50

Skinner's Pat. Drill Chucks.....30¢ doz \$3.00

Skinner's Independent Lathe Chucks.....40¢ doz \$4.00

Skinner's Pat. Comb. Chuck.....40¢ doz \$4.00

**Clamps—**

R. I. Tool Co.'s Wrought Iron.....25¢ doz \$2.50

Adjustable, Gray's.....20¢ doz \$2.00

Adjustable, Lambert's.....20¢ doz \$2.00

Adjustable, Snow's.....40¢ doz \$4.00

Adjustable, Hammers.....15¢ doz \$1.50

Adjustable, Stearn's.....20¢ doz \$2.00

Stearn's Adjustable Cabinet and Corner.....20¢ doz \$2.00

Cabinet, Sargent's.....60¢ doz \$6.00

Carriage Makers', Sargent's.....70¢ doz \$7.00

Eberhard Mfg. Co.'s.....40¢ doz \$4.00

Warner's.....40¢ doz \$4.00

Saw Clamps, see Vises.

**Clips—**

Norway, Axle, 1/2 & 5-16.....55¢ doz \$5.50

2nd grade Norway Axle, 1/2 & 5-16.....65¢ doz \$6.50

Superior Axle Clips.....60¢ doz \$6.00

Norway Spring Bar Clips, 5-16.....60¢ doz \$6.00

Wrought-Iron Felloe Clips, \$ 10.....50¢ doz \$5.00

Steel Felloe Clips.....\$ 10 doz \$10.00

Baker Axle Clips.....25¢ doz \$2.50

Cockeyes.....50¢ doz \$5.00

Cocks, Brass.....50¢ doz \$5.00

Hardware list.....50¢ doz \$5.00

**Coffee Mills—**

Box and Slide, list Jan. 1, 1888.....60¢ doz \$6.00

American, Enterprise Mfg. Co. 20&10&30¢ doz \$20.00

The Swift, Lane Bros.....20&10¢ doz \$20.00

**Compasses Dividers, &c—**

Compasses, Callipers, Dividers, 70¢ doz \$7.00

Bemis & Call Co.'s.....60¢ doz \$6.00

Dividers.....50¢ doz \$5.00

Compasses & Callipers.....50¢ doz \$5.00

Wing and Inside or Outside.....50¢ doz \$5.00

Double.....60¢ doz \$6.00

(Call's Pat. Inside).....60¢ doz \$6.00

Excelsior.....60¢ doz \$6.00

J. Stevens & Co.'s.....25&10¢ doz \$25.00

Starrett's.....25&10¢ doz \$25.00

Spring Callipers and Dividers 25&10¢ doz \$25.00

Lock Callipers and Dividers.....25&10¢ doz \$25.00

Combination Dividers.....25&10¢ doz \$25.00

**Coopers' Tools—**

Bradley's.....20¢ doz \$2.00

Barton's.....20¢ doz \$2.00

L. & J. J. White.....20¢ doz \$2.00

Albertson Mfg. Co.....25¢ doz \$2.50

Beatty's.....30¢ doz \$3.00

Sandusky Tool Co.....30¢ doz \$3.00

**Corkscrews—**

Humason & Beckley Mfg. Co. 40¢ doz \$4.00

Clough's Pat.....33¢ doz \$3.30

Howe Bros & Hulbert.....35¢ doz \$3.50

**Cork Knives and Cutters—**

Bradley's.....10¢ doz \$1.00

Wadsworth's.....25¢ doz \$2.50

**Cradles—**

Grain.....50¢ doz \$5.00

Cravous.....50¢ doz \$5.00

White Crayons, \$ gr 12¢ doz \$1.20

D. M. Stewart Mfg. Co. Metal Work.....25¢ doz \$2.50

D. M. Stewart Mfg. Co., Rolling Mill.....25¢ doz \$2.50

\$ gr \$2.50.....25¢ doz \$2.50

See also Chalk.

**Crow Bars—**

Cast Steel.....\$ 10 doz \$10.00

Iron, Steel Points.....\$ 10 doz \$10.00

**Curry Combs—**

Fitch's.....50¢ doz \$5.00

Rubber per doz \$10.00.....20¢ doz \$2.00

Perfect.....50¢ doz \$5.00

**Curtain Pins—**

Silvered Glass.....net

White Enamel.....net

**Cutlery—**

Beaver Falls & Booth's.....33¢ doz \$3.30

Wootenholme.....\$7.75 to \$8.00

**Dampers, &c—**

Dampers, Buffalo.....40¢ doz \$4.00

Buffalo Damper Clips.....40¢ doz \$4.00

Crown Damper.....40¢ doz \$4.00

Excelsior.....40¢ doz \$4.00

**Dividers—**

See Compasses.

**Dog Collars—**

Embossed, Gilt, Pope & Steven's list.....30¢ doz \$3.00

Leather, Pope & Steven's list.....40¢ doz \$4.00

Brass, Pope & Steven's list.....40¢ doz \$4.00

**Door Springs—**

Torrey's Rod, regular size.....\$ doz \$1.30

Gray's, \$ gr., \$20.00.....20¢ doz \$2.00

Bee Rod \$ gr., \$20.00.....20¢ doz \$2.00

Warner's No. 1, \$ doz, \$2.50; No. 2, \$3.50.....40¢ doz \$4.00

Star (Coll.) list April 19, 1886.....10¢ doz \$1.00

Star (Coll.) list April 19, 1886.....20¢ doz \$2.00

Victor (Coll.).....60¢ doz \$6.00

Champion (Coll.).....60¢ doz \$6.00

Philadelphia 5 in., \$5.00; 8 in., \$7.75.....\$ doz \$7.75

Cowell's No. 1, \$ doz, \$18.00; No. 2, \$25.00.....40¢ doz \$4.00

Rubber, complete, \$ doz, \$4.50.....55¢ doz \$5.50

Hercules.....50¢ doz \$5.00

Shaw Door Check and Spring, 25¢ doz \$2.50

**Drawing Knives—**

W. H. Witherby.....75¢ doz \$7.50

P. S. & W.....75¢ doz \$7.50

Mix.....75¢ doz \$7.50

New Haven.....75¢ doz \$7.50

Merrill.....60¢ doz \$6.00

Douglas.....75¢ doz \$7.50

Watrous.....15¢ doz \$1.50

L. & J. J. White.....20¢ doz \$2.00

Bradley's.....35¢ doz \$3.50

Adjustable Handle.....25¢ doz \$2.50

Wilkinson's Folding.....25¢ doz \$2.50

**Drills and Drill Stocks—**

Blacksmiths'.....each \$1.75

Blacksmiths' Self-Feeding, each \$7.50, 20¢ doz \$15.00

Breast, P. S. & W.....40¢ doz \$4.00

Breast, Wilson's.....30¢ doz \$3.00

Breast, Millers Falls.....each \$3.00, 25¢ doz \$7.50

Breast, Bartholomew's.....each \$2.50, 25¢ doz \$6.25

Ratchet, Merrill's.....20¢ doz \$2.00

Ratchet, Ingersoll's.....25¢ doz \$2.50

Ratchet, Parker's.....20¢ doz \$2.00

Ratchet, Whitney's.....20¢ doz \$2.00

Ratchet, Weston's.....20¢ doz \$2.00

Ratchet, Moore's Triple Action.....25¢ doz \$2.50

Ratchet, Curtis & Curtis.....30¢ doz \$3.00

Whitney's Hand Drill, Plain, \$11.00.....40¢ doz \$4.00

Adjustable, \$12.00.....40¢ doz \$4.00

Wilson's Drill Stocks.....10¢ doz \$1.00

Automatic Boring Tools.....\$1.75 to \$1.85

Twist Drills—

Morse.....50¢ doz \$5.00

Standard.....50¢ doz \$5.00

Syracuse (Metal list).....50¢ doz \$5.00

Cleveland.....50¢ doz \$5.00

Williams.....50¢ doz \$5.00

New Process.....50¢ doz \$5.00

Drill Bits.—See Augers and Bits.

**Drill Chucks.—See Chucks.****Dripping Pans—**

Small sizes.....\$ 10 doz \$10.00

Large sizes.....\$ 10 doz \$10.00

**Egg Beaters.**

Dover.....\$ doz \$1.50

National, \$ doz \$4.50.....35¢ doz \$3.50

Family (T. & S. Mfg. Co.), \$ gro \$17.00.....\$18.00

Duplex (Standard Co.).....\$ gro \$15.00

Rival (Standard Co.).....\$ gro \$12.00

Large Duplex (Standard Co.), \$ doz \$4.50

Triumph (T. & S. Mfg. Co.), \$ gro \$10.50

Advance, No. 1.....\$ doz \$11.50

Advance, No. 2.....\$ doz \$10.50

Bryan's.....\$ doz \$14.00

Ayres' Spiral.....\$ doz \$5.00

Double (H. & R. Mfg. Co.).....\$ doz \$16.20

Triple (H. & R. Mfg. Co.).....\$ doz \$14.00

Spiral (H. & R. Mfg. Co.).....\$ doz \$4.50

Paine, Diehl & Co.'s.....\$ doz \$24.00

**Egg Poachers—**

Buffalo Steam Egg Poachers, \$ doz, No. 1, \$6.00; No. 2, \$9.00.....25¢ doz \$2.50

**Electric Bell Sets.—**



Cross-Cut Saw Handles—  
Atkins' No. 1 Loop, pair, 28¢; No. 3, 18¢; No. 6, 16¢; No. 2 and No. 4 Reversible, 18¢.  
Boynton's Loop Saw Handles, 50¢... 60¢  
Champion..... 15¢

**Hangers—**  
Barn Door, old patterns, 60¢10¢10¢70¢  
Barn Door, New England, 60¢10¢10¢70¢  
Samson Steel Anti-Friction..... 70¢  
Orleans Steel..... 55¢  
Hamilton Wrought Wood Track..... 55¢  
U. S. Wood Track..... 55¢  
Champion..... 60¢10¢  
Rider and Wooster, Medina Mfg. Co.'s  
Bat..... 70¢  
Climax Anti-Friction..... 70¢  
Climax Anti-Friction for Wood Track..... 55¢  
Zenith for Wood Track..... 55¢  
ed's Steel Arm..... 50¢  
alliance, Barn Door..... 50¢  
Sterling's Improved (Anti-Friction)..... 10¢  
Victor, No. 1, \$15.00; No. 2, \$16.50; No. 3, \$18.00..... 60¢2¢  
Cheritree..... 50¢10¢  
Kiddier's..... 50¢10¢60¢  
The Boss..... 60¢10¢  
Best Anti-Friction..... 60¢10¢  
Duplex (Wood Track)..... 60¢10¢5¢  
Terry's Pat., ½ doz pr. 4 in. 10.00; 5 in. 12.00..... 50¢5¢10¢10¢  
Cronk's Pat., No. 4, \$12.00; No. 5, \$14.40; No. 6, \$18.00..... 50¢15¢60¢  
Wood Track Iron Clad, ½ ft. 10¢ 50¢15¢60¢

Carrier Steel Anti-Friction..... 50¢5¢10¢  
Architect, ½ set \$6.00..... 20¢  
Eclipse..... 20¢10¢  
Felix, ½ set \$4.50..... 20¢  
Richards..... 30¢30¢10¢  
Lane's Steel Anti-Friction..... 30¢  
Ball Bearing Door Hanger, 20¢10¢25¢10¢  
Warner's Pat..... 20¢20¢10¢  
Stearns' Anti-Friction..... 20¢20¢10¢  
Stearns' Challenge..... 25¢10¢25¢10¢10¢  
Faultless..... 40¢40¢5¢  
American, ½ set \$6.00..... 20¢10¢  
Rider & Wooster, No. 1, 60¢; No. 2, 75¢  
Paragon, Nos. 1, 2 and 3..... 40¢  
Cincinnati..... 25¢10¢  
Paragon, Nos. 5, 5½, 7 and 8..... 20¢10¢  
Crescent..... 60¢40¢10¢  
Nickel, Cast Iron..... 50¢  
Nickel, Malleable Iron and Steel..... 40¢  
Scranton Anti-Friction Single Strap..... 35¢  
Scranton Anti-Friction Double Strap..... 40¢  
Universal Anti-Friction..... 40¢  
Wild West, 4 in. Wheel, \$15.00; 5 in. Wheel, \$21.00..... 45¢  
Star..... 40¢10¢40¢10¢5¢  
May..... 50¢5¢50¢10¢  
Barry, \$6.00..... 40¢10¢

**Harness Snaps—**  
See Snaps.

**Hatchets—**  
List Jan. 1, 1888..... 35¢40¢  
Isaiah Blood..... 35¢40¢  
Hunt's Shingling, Lath and Claw..... 40¢5¢  
Hunt's Broad..... 40¢  
Buffalo Hammer Co..... 40¢10¢50¢  
Hurd's..... 40¢10¢50¢  
Fayette R. Plumb..... 40¢10¢50¢  
Wm. Mann, Jr., & Co..... 50¢50¢5¢  
Underhill Edge Tool Co..... 40¢50¢40¢10¢  
Underhill's, Haines and Bright..... 35¢  
C. Hammond & Son..... 40¢10¢50¢  
Simmons..... 40¢10¢50¢  
Peck's..... 40¢10¢40¢10¢5¢  
Kelly's..... 50¢50¢50¢  
Sargent & Co..... 50¢  
Ten Eyck Edge Tool Co. 40¢10¢40¢10¢5¢  
Collins..... 10¢  
Schulte, Lohoff & Co..... 50¢50¢50¢

**Hay and Straw Knives—**  
Lightning, Mfrs' price ½ doz \$18.00, 25¢ But jobbers cut this price freely.  
Gem..... ½ doz \$10  
Wadsworth's..... 40¢75¢40¢10¢  
Carter's Needle..... ½ doz \$11.50 to \$12.00  
Heath's..... ½ doz \$13.50 to \$14.00  
Auburn Hay, Com. and Spear Point..... 30¢  
Auburn, Straw..... 40¢  
Nolin's Hay..... ½ doz \$10.00

**Hinges—**  
Wrought Iron Hinges  
Strap and T..... 75¢5¢75¢10¢  
Screw Hook and Strap..... 14 to 20 in. ½ doz 34¢  
Heavy Welded Hook..... 14 to 20 in. ½ doz 34¢  
Screw Hook and Eye..... ½ in. ½ doz \$1.50  
Rolled Blind Hinges, Nos. 22 and 24..... 50¢10¢  
Rolled Blind Hinges, Nos. 232 and 234..... 55¢10¢  
Rolled Plate..... 70¢10¢  
Rolled Raised..... 70¢10¢  
Plate Hinges, 8, 10 and 12 in. ½ doz 4¢  
"Providence" over 12 in. ½ doz 4¢  
Spring Hinges—  
Geer's Spring and Blank Butts..... 40¢  
Union Spring Hinge Co.'s list, March, 1886..... 20¢  
Acme..... 30¢  
U. S..... 25¢10¢  
Empire and Monarch..... 55¢  
American, Gem, and Star..... 20¢  
Oxford..... 20¢  
Barker's Double Acting..... 20¢10¢  
nlon Mfg. Co..... 25¢  
Bommer's..... 30¢  
Buckman's..... 15¢20¢  
Chicago..... 30¢  
Wiles..... 10¢  
Devore's..... 40¢  
Royal..... 60¢  
Reliable..... 60¢  
Champion..... 60¢

**Gate Hinges—**  
Western..... ½ doz \$4.40, 60¢  
N. E. Reversible..... ½ doz \$7.50, 50¢  
Clark's, Nos. 1, 2, 3..... 60¢10¢5¢  
N. Y. State..... ½ doz \$5.00, 55¢10¢  
Automatic..... 50¢  
Common Sense..... ½ doz pair \$4.50, 50¢  
Seymour's..... 40¢10¢  
Shepard's..... 60¢10¢5¢  
Reed's Latch and Hinges..... ½ doz \$12.00, 50¢

**Blind Hinges—**  
Parker..... 75¢2¢  
Palmer..... 50¢5¢10¢  
Seymour..... 70¢5¢  
Nicholson..... 45¢10¢  
Huffer..... 50¢

Clark's, Nos. 1, 3, 5, 40 and 50..... 75¢10¢5¢80¢  
Clark's Mortise Gravity..... 50¢  
Sargent's, Nos. 1, 3, 5, 11, 13..... 75¢10¢55¢10¢5¢  
Reading's Gravity..... 75¢10¢75¢10¢5¢  
Shepard's..... 75¢10¢5¢  
Noisless..... 75¢10¢5¢  
Niagara..... 80¢2¢  
Buffalo..... 80¢5¢  
Clark's Genuine Pat..... 80¢5¢  
O. S., Lull & Porter..... 75¢10¢80¢  
Acme, Lull & Porter..... 75¢5¢  
Queen City Reversible..... 75¢  
Clark's Lull & Porter, Nos. 0, 1, 1½, 2, 2½, 3..... 75¢10¢2¢5¢  
North's Automatic Blind Fixtures, No. 2, for Wood, \$10.50; No. 3, for Brick, \$13.50..... 25¢2¢

**Hoes—**  
Handled—  
Garden, Mortar, &c..... 70¢  
Planter's, Cotton, &c..... 70¢  
Warren Hoe..... 60¢  
Magie..... ½ doz \$4.00

**Eye—**  
D. & H. Scovill..... 20¢  
Lane's Crescent Planter Pattern..... 45¢5¢  
Lane's Razor Blade, Scovill Patent..... 30¢  
Maynard, S. & O. Pat..... 60¢5¢  
Sandusky Tool Co., S. & O. Pat..... 60¢10¢  
Hubbard & Co., S. & O. Pat. 60¢5¢60¢10¢  
Chattanooga Tool Co., S. & O. Pat. 60¢5¢60¢10¢  
Grog..... 60¢60¢10¢

**Hug Rings and Ringers—**  
Hill's Improved Ringers..... ½ doz \$4.25  
Hill's Old Style Ringers..... ½ doz \$2.75  
Hill's Tonga..... ½ doz \$4.50  
Hill's Rings..... ½ doz bxs \$2.15 to \$2.25  
Perfect Rings..... ½ doz bxs \$1.60 to \$1.70  
Perfect Ringers..... ½ doz \$2.15 to \$2.25  
Blair's Hog Ringers..... ½ doz \$2.25 to \$2.50  
Blair's Hog Rings..... ½ doz \$0.90 to \$1.00  
Champion Ringers..... ½ doz \$2.00  
Champion Rings, Double..... ½ doz \$2.25  
Brown's Ringers..... ½ doz \$2.00  
Brown's Rings..... ½ doz \$1.25 to \$1.30

**Hoisting Apparatus—**  
Moore's Hand Hoist, with Lock..... 20¢  
Moore's Differential Pulley Block..... 40¢  
Energy Mfg. Co.'s..... 25¢

**Holders, File and Tool—**  
Bals Pat..... ½ doz \$4.00; 25¢  
Nicholson File Holders..... 20¢

**Hollow-Ware—**  
Iron—  
Stove Hollow-Ware—  
Ground..... 60¢60¢5¢  
Unground..... 60¢10¢60¢10¢10¢  
Boilers and Saucepans..... 40¢5¢  
Tinned Boilers and Saucepans..... 40¢  
Gray Enamelled-Ware—  
Stove..... 45¢50¢  
Maslin Kettles..... 60¢10¢60¢10¢10¢  
Boilers and Saucepans..... 40¢5¢  
Agate and Granite Ware, list Jan. 1, 1889..... 35¢10¢  
Rustless Hollow-Ware..... 50¢50¢5¢  
Galvanized Tea-Kettles—  
Inch..... 6 7 8 9  
Each..... 55¢ 60¢ 65¢ 75¢

**Silver Plated—**  
4 mo. or 5 ¢ cash in 30 days.  
Meriden Britannia Co..... 40¢5¢  
Simpson, Hall, Miller & Co..... 40¢5¢  
Rogers & Brother..... 40¢5¢5¢  
Hartford Silver Plate Co..... 40¢5¢5¢  
William Rogers Mfg. Co..... 40¢5¢5¢

**Hooks—**  
Cast Iron—  
Bird Cage, Sargent's list..... }  
Bird Cage, Reading list..... } 60¢10¢10¢  
Clothes Line, Sargent's list..... }  
Clothes Line, Reading list..... }  
Ceiling, Sargent's list..... 60¢10¢60¢10¢10¢  
Harness, Reading list..... 55¢10¢55¢10¢10¢  
Coat and Hat, Sargent's list..... 55¢10¢60¢10¢  
Coat and Hat, Reading..... 50¢10¢50¢10¢10¢  
Wrought Iron—  
Cotton..... ½ doz \$1.25  
Cotton Pat. (N.Y. Mallet & Handle Wks.)..... 30¢  
Tassel and Picture (T. & S. Mfg. Co.)..... 30¢  
Wrought Stapler, Hook..... 40¢  
See Wrought Goods.

**Wire—**  
Wire Coat and Hat, Gem, list April, 1886..... 50¢  
Wire Coat and Hat, Miles, list April, 1886..... 50¢  
Indestructible Coat and Hat..... 45¢  
Wire Coat and Hat, Standard..... 45¢  
Belt..... 80¢80¢10¢

**Miscellaneous—**  
Grass No. 2, \$2.00; No. 3, \$2.25; No. 4, \$2.50  
Nolin's Grass..... ½ doz \$2.25  
Bush..... 55¢60¢  
Hooks and Eyes—Malleable iron..... 70¢70¢10¢  
Hooks and Eyes—Brass..... 60¢10¢10¢  
Fish Hooks, American..... 50¢  
Bench Hooks..... See Bench Stops.

**Horse Nails—**  
Nos. 6 7 8 9 10  
Ausable..... 28¢ 26¢ 25¢ 24¢ 23¢  
Clinton, Fin..... 10¢ 11¢, net  
Essex..... 28¢ 26¢ 25¢ 24¢ 23¢  
Lyra..... 25¢ 23¢ 22¢ 21¢ 20¢  
Snowden..... 25¢ 23¢ 22¢ 21¢ 20¢  
Putnam..... 23¢ 21¢ 20¢ 19¢ 18¢  
Vulcan..... 23¢ 21¢ 20¢ 19¢ 18¢  
Northwest..... 25¢ 23¢ 22¢ 21¢ 20¢  
Globe..... 23¢ 21¢ 20¢ 19¢ 18¢  
Boston..... 23¢ 21¢ 20¢ 19¢ 18¢  
A. C..... 25¢ 23¢ 22¢ 21¢ 20¢  
C. B.-K..... 25¢ 23¢ 22¢ 21¢ 20¢  
Champlain..... 28¢ 26¢ 25¢ 24¢ 23¢

New Haven..... 28¢ 26¢ 25¢ 24¢ 23¢  
Saranac..... 23¢ 21¢ 20¢ 19¢ 18¢  
Champion..... 25¢ 23¢ 22¢ 21¢ 20¢  
Capewell..... 23¢ 21¢ 20¢ 19¢ 18¢  
Star..... 23¢ 21¢ 20¢ 19¢ 18¢  
Anchor..... 23¢ 21¢ 20¢ 19¢ 18¢  
Western..... 23¢ 21¢ 20¢ 19¢ 18¢  
Empire Branded..... 10¢10¢10¢  
Horse Shoes—See Shoes Horse.

**Hose, Rubber—**  
Competition..... 75¢10¢75¢10¢5¢  
Standard..... 70¢70¢10¢  
Extra..... 60¢60¢10¢  
N. Y. B. & P. Co., Para..... 30¢10¢  
N. Y. B. & P. Co., Extra..... 50¢  
N. Y. B. & P. Co., Dundee..... 60¢10¢5¢

**Haskers—**  
Blair's Adjustable..... ½ gr \$8.00  
Blair's Adjustable Clipper..... ½ gr 7.00

**Indurated Fiber-Ware—25 ¢**  
Splittoons, No. 2, ½ doz..... \$9.00  
Basins, Ringed, ½ doz..... No. 1, \$4.80; No. 2, \$4.20; No. 3..... \$3.60  
Washtubs, Nested, Nos. 0, 1, 2 and 3 (4 pieces), ½ nest..... \$3.70  
Keelers, Nested, Nos. 1, 2, 3 and 4 (4 pieces), ½ nest..... \$3.70  
Butter Bowls 15, 17 and 19-inch (3 pieces), ½ nest..... \$2.25  
Liquid Measures, pt., qt., 2 qt. and funnel (4 pieces) ½ set..... \$4.00  
Dr. Measures, 1, 2, 4, 8 and 16 qts. (5 pieces), ½ set..... \$3.00  
See also *Falls*.

**Jack Screws—See Screws.**

**Kettles—** Spun, Stamped.  
Braas, 7 to 17 in., ½ doz 21¢ 21¢  
Braas, larger than 17 in., 26¢ 23¢  
Enamelled and Tea Kettles..... See *Hollow-Ware*.

**Keys—**  
Lock Ass'n list Dec. 30, 1888..... 50¢10¢  
Eagle, Cabinet, &c..... 33¢42¢  
Hotchkiss' Brass Blanks..... 40¢  
Hotchkiss, Copper and Tin..... 40¢  
Hotchkiss' Pad, and Cab..... 35¢  
Ratchet Bed Keys..... ½ doz \$4.00, 15¢  
Wollensak Tinned..... 50¢10¢

**Knife Sharpeners—**  
Parkin's.....  
Applewood Handles..... ½ doz \$6.00, 40¢  
Rosewood or Cocobolo..... ½ doz \$9.00, 40¢

**Knives—**  
Wilson's Butcher Knives..... 25¢30¢  
Ames' Butcher Knives..... 25¢  
Foster Bros' Butcher, &c..... 40¢  
Nichols' Butcher Knives..... 40¢10¢  
Ames' Shoe Knives..... 20¢25¢  
Ames' Bread Knives..... ½ doz \$1.50, 15¢20¢  
Moran's Shoe and Bread..... 20¢  
Hay and Straw..... See *Hay Knives*.  
Table and Pocket..... See *Cutlery*.  
Corn, Auburn Mfg. Co. Western Pat..... 80¢  
Corn, Auburn Mfg. Co. Crescent..... \$3.50

**Knobs—**  
Door Mineral..... 65¢68¢  
Door Por. Jap'd..... 75¢78¢  
Door Por. Nickel..... \$2.00 to \$2.25  
Door Por. Plated, Nickel..... \$2.00 to \$2.25  
Drawer, Porcelain..... 60¢10¢60¢10¢10¢  
Hemlock Door Knobs..... 40¢10¢50¢  
Yale & Towne Wood, list Dec. 1885..... 40¢  
Furniture Plain..... 75¢ gro inch, 10¢  
Furniture, Wood Screws..... 25¢10¢5¢  
Base, Rubber Tip..... 70¢10¢5¢  
Picture, Jap'd..... 30¢10¢10¢10¢  
Picture, Sargent's..... 70¢10¢  
Picture, Hemlock..... 35¢5¢  
Shutter, Porcelain..... 65¢10¢  
Carriage, Jap..... ½ gro 80¢, 60¢10¢

**Ladies—**  
Melting, Sargent's..... 55¢10¢  
Melting, Reading..... 35¢10¢  
Melting, Monroe's Pat..... ½ doz \$4.00, 40¢  
Melting, P. S. & W..... 35¢10¢40¢  
Melting, Warner's..... 30¢

**Lanterns—**  
Tubular—  
Plain with Guards, ½ doz..... \$4.00 to \$4.25  
Lift Wire, with Guards..... \$4.50 to \$4.75  
Square Plain, with Guards..... \$4.00 to \$4.25  
Sq. Lift Wire, with Guards..... \$4.25 to \$4.50  
Without Guards, 25¢ ½ doz less.

**Miscellaneous—**  
Police, Small, \$6.00; Medium, \$7.25; Large, \$8.75..... 20¢25¢  
**Lawn Mowers—**  
Standard List..... 50¢10¢  
Quaker City..... 60¢10¢  
Enterprise..... 60¢10¢

**Lemon Squeezers—**  
Porcelain Lined, No. 1..... ½ doz \$6.00, 25¢30¢  
Wood, No. 2..... ½ doz \$3.00, 35¢  
Wood, Common..... ½ doz \$1.70 to \$1.75  
Dunlap's Improved..... ½ doz \$3.75, 20¢  
Sammis, No. 1, \$5.00; No. 2, \$6.12; \$18 ½ doz..... 25¢10¢  
Jennings' Star..... ½ doz \$2.50  
The Boss..... ½ doz \$2.50  
Dean's, Nos. 1, ½ doz \$6.50; 2, \$3.35; 3, \$1.90  
Little Giant..... 50¢50¢5¢  
King..... 40¢5¢

**Lines—**  
Cotton and Linen Fish, Draper's..... 50¢  
Draper's Chalk..... 60¢  
Draper's Mason's Linen, 84 ft., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25..... 25¢  
Cotton Chalk..... 35¢  
Samson, Cotton, No. 4, \$2; No. 4½, \$2.50..... 10¢  
Silver Lake, Braided, No. 0, \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50 ½ gro..... 25¢  
Mason's Linen, No. 3½, \$1.50; No. 4, \$2.00; No. 4½, \$2.50..... 45¢  
Mason's Colored Cotton..... 45¢  
W. P. Clothes, Nos. 18 19 20..... \$3.00 \$3.00 \$2.5¢

Ventilator Cord, Samson Braided, White or Drab Cotton, ½ doz \$7.50, 20¢

**Locks, &c.—**  
Door Locks, Latches, &c.  
R. & E. Mfg. Co., list Mar. 20, 1889.....  
Mallory, Wheeler & Co., list July, '88..... 60¢10¢60  
Sargent & Co., list Aug. 1, '88.....  
Reading Hardware Co., list Feb. 2, '88.....  
Note.—Lower net prices often made.  
Perkins' Burglar Proof..... 60¢25¢  
Plate..... 33¢22¢  
F. Many's "Extension Cylinder" \$10.50 ½ doz.

Barnes Mfg. Co..... 40¢40¢10¢  
Yale..... net prices  
Deltz Flat Key..... 30¢  
L. & C. Round Key Latches..... 30¢10¢  
L. & C. Flat Key Latches..... 33¢40¢  
Sheridan's Night Latches..... 15¢  
Shepardson or U. S..... 30¢  
Felter or American..... 40¢10¢  
Seed's N. Y. Hasp Lock..... 25¢

**Cabinet—**  
Eagle, Gaylord Par..... list March, '84, rev ker and Corbin..... Jan. 1, '85, 33¢42¢  
Deltz, Nos. 36 to 39..... 40¢  
Deltz, Nos. 51 to 63..... 40¢10¢  
Deltz, Nos. 86 to 96..... 30¢  
Stoddard Lock Co..... 30¢33¢4¢  
"Champion" Night Latches..... 40¢  
Barnes Mfg. Co..... 40¢40¢10¢  
Eagle and Corbin Trunk..... 25¢2¢  
"Champion" Cab. and Combin..... 33¢4¢  
Yale..... net prices  
Romer's..... 25¢

**Padlocks—**  
List Dec. 23, '84..... 75¢75¢10¢  
Yale Lock Mfg. Co.'s..... net prices  
Eagle..... 25¢2¢  
Eureka, Eagle Lock Co..... 40¢2¢  
Romer's, Nos. 0 to 91..... 30¢  
Romer's Scandinavian, &c., Nos. 100 to 150..... 50¢15¢  
A. E. Delta..... 40¢  
Champion Padlocks..... 40¢  
Hotchkiss..... 30¢  
Star..... 45¢  
Horsehoe..... ½ doz \$9.40 to \$10.10  
Barnes Mfg. Co..... 40¢40¢10¢  
Nock's..... 30¢  
Brown's Pat..... 25¢  
Scandinavian..... 90¢60¢10¢  
E. T. Fraim's Keystone Scandinavian: Nos. 119, 120, 135 and 140..... 90¢10¢  
Other Nos..... 65¢  
Ames Sword Co. up to No. 150..... 40¢  
Ames Sword Co. above No. 150..... 50¢

**Lumber Tools.**  
Ring Peavies, "Blue Line"..... ½ doz \$20.00  
Ring Peavies, Common..... ½ doz \$18.00  
Steel Socket Peavies..... ½ doz \$21.00  
Mail Iron Socket Peavies..... ½ doz \$19.00  
Cant Hooks, "Blue Line"..... ½ doz \$16.00  
Cant Hooks, Common Finish..... ½ doz \$14.00  
Cant Hooks, Mail, Socket Clamp, "Blue Line" Finish..... ½ doz \$16.00  
Cant Hooks, Mail, Socket Clamp, Common Finish..... ½ doz \$14.00  
Cant Hooks, Clip Clamp, "Blue Line" Finish..... ½ doz \$14.00  
Cant Hooks, Clip Clamp, Common Finish..... ½ doz \$12.00  
Hand Spikes..... ½ doz 6 ft., \$15.00; 8 ft., \$20.00  
Pike Poles, Pike & Hook, ½ doz, 12 ft., \$11.50; 14 ft., \$12.50; 16 ft., \$14.50; 18 ft., \$17.50; 20 ft., \$21.50  
Pike Poles, Pike only, ½ doz, 12 ft., \$10.00; 14 ft., \$11.00; 16 ft., \$13.00; 18 ft., \$16.00; 20 ft., \$20.00  
Pike Poles, not ironed, ½ doz, 12 ft., \$6.00; 14 ft., \$7.00; 16 ft., \$8.00; 18 ft., \$12.00; 20 ft., \$16.00  
Setting Poles, ½ doz, 12 ft., \$14.00; 14 ft., \$15.00; 16 ft., \$17.00  
Swamp Hooks..... ½ doz \$18.00

**Lustro—**  
Four-ounce Bottles..... ½ doz, \$1.75; ½ gross..... \$17.00

**Mallets—**  
Hickory..... 20¢10¢20¢10¢10¢  
Lignumvitae..... 20¢10¢20¢10¢10¢  
B. & L. Block Co., Hickory & L. V..... 30¢30¢10¢

**Match Safes—**  
Dangerfield's Self-Igniting..... ½ doz \$1.5

**Mattocks, Regular list..... 60¢60¢10¢**

**Meat Cutters—**  
Dixon's ½ doz..... 40¢5¢  
Nos..... 1 2 3  
\$14.00 \$17.00 \$20.00  
Woodruff's ½ doz..... 40¢5¢  
Nos..... 100 150  
\$15.00 \$18.00

Champion ½ doz..... 40¢45¢  
Nos..... 300 400  
\$22.00 \$27.00 \$40.00  
Hales Pattern ½ doz..... 70¢70¢5¢  
Nos..... 11 12 13  
\$27.00 \$33.00 \$45.00  
American..... 30¢  
Nos..... 1 2 3 4 5  
Each..... \$5 \$7 \$10 \$25 \$50 \$60  
Enterprise..... 30¢  
Nos..... 10 12 22 32 42  
Each..... \$3 \$2.50 \$4 \$6 \$15  
Pennsylvania..... 40¢10¢  
Nos..... \$24.00 \$28.00 \$36.00 \$28.00  
Miles' Challenge ½ doz..... 45¢45¢10¢  
Nos..... 1 2 3  
\$22.00 \$30.00 \$40.00  
Home No. 1..... ½ doz, \$26.00, 55¢10¢  
Draw Cut, each.....  
Nos..... 2 6 8  
\$50 \$75 \$80 \$200 \$250  
Beef Shavers (Enterprise)..... 20¢10¢30¢  
Chadborn's Smoked Beef Cutter. ½ doz \$66.00

**Mining Knives—**  
Am. (2d quality), ½ gr., 1 blade, \$7; 2 blades, \$12; 3 blades, \$18..... net  
Lothrop's..... 20¢10¢  
Smith's, ½ doz, Single, \$2.00; Double, \$3  
Knapp & Cowles..... 50¢10¢60¢  
Buffalo Adir. 2 blade..... ½ doz \$3.00, 25¢

**Molasses Gates—**

Stebbin's Pat.	75¢
Stebbin's Genuine.	60¢10¢10¢
Stebbin's Tinned Ends.	40¢10¢
Chase's Hard Metal.	50¢10¢
Bush's.	20¢
Lincoln's Pattern.	70¢10¢10¢
Wood's.	20¢10¢

Boss, 7 doz.  
Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

Money Drawers. 7 doz, \$18 to \$20

**Muzzles—**

Safety. 7 doz, \$3.00, 25¢

**Nails, see Trade Report.**

Wire Nails, Papered.  
Association list, July 15, 1889.  
70¢10¢10¢70¢10¢10¢5¢

Tack Mfrs. list. 70¢70¢5¢  
Wire Nails, Standard Penny.  
Card June 1, '89, base. \$2.40 to \$2.50

**Nail Puller—**

Curtiss Hammer. 7 doz \$9.00  
Giant, No. 1. 7 doz \$30.00, 10¢  
Pelican. 7 doz \$30.00, 25¢  
Boss. 7 doz \$30.00, 30¢  
Lightning. 7 doz \$21.00

**Nail Sets—**

Square. 7 gr, \$4.00 to \$4.25  
Round. 7 gr, \$3.25  
Cannon's Diamond Point. 7 gr, \$12, 20¢

**Nut Crackers—**

Table (H. & B. Mfg. Co.). 40¢  
Blake's Pattern. 7 doz \$2.00, 10¢  
Turner & Seymour Mfg. Co. 50¢

**Nuts—**

Nuts, off list Jan. 1, 1888: Square, Hex.  
Hot Pressed. 5.4¢ 5.9¢  
Cold Punched. 5.4¢ 5.5¢  
In lots less than 100 lb, add 1/2¢; 1-lb  
boxes, add 1¢ to list.

**Oakum—**

Gov. Government. 7 lb 71¢ to 74¢  
U. S. Navy. 7 lb 61¢ to 64¢  
Navy. 7 lb 51¢ to 54¢

**Oilers—**

Zinc and Tin. 65¢ to 65¢10¢  
Brass and Copper. 50¢10¢ to 50¢10¢5¢  
Malleable, Hammers' Improved, No. 1,  
\$3.60; No. 2, \$4.00; No. 3, \$4.40 per doz.

Malleable, Hammers, Old Pattern, same  
list. 40¢  
Prior's Pat. or "Paragon" Zinc,  
60¢10¢10¢

Prior's Pat. or "Paragon" Brass. 50¢  
Olmstead's Tin and Zinc. 60¢  
Olmstead's Brass and Copper. 50¢  
Broughton's Zinc. 60¢  
Broughton's Brass. 50¢  
Gem P. D. & Co. 70¢

**Packing, Steam—**

Rubber.  
Standard. 60¢10¢ to 60¢10¢10¢  
Extra. 50¢10¢ to 50¢10¢60¢

N. Y. B. & P. Co., Standard. 50¢10¢5¢  
N. Y. B. & P. Co., Empire. 70¢  
N. Y. B. & P. Co., Salamander. 70¢

Jenkins' Standard. 7 lb 65¢, 30¢  
Miscellaneous—  
American Packing. 10¢ to 11¢  
Russia Packing. 14¢  
Italian Packing. 13¢ to 14¢  
Cotton Packing. 15¢ to 17¢  
Jute. 7¢ to 8¢

**Padlocks—**

See Locks.

**Pails—**

Galvanized Iron—  
Quarts. 10 12 14  
Hill's Light Weight, 7 doz, \$2.75 3.00 3.25  
Hill's Heavy Weight, 7 doz, 3.00 3.25 3.75  
Whiting's. 2.75 3.00 3.25  
Sidney Shephard & Co. 2.80 3.00 3.40  
Iron Clad. 2.75 3.00 3.25  
Fire Buckets. 2.75 3.25 3.50  
Buckets, see Well Buckets.

Indurated Fibre Ware—25¢  
Star Pails, 12 qt. 7 doz \$6.00  
Fire, Stable and Milk, 14 qt. 7 doz \$7.80

Standard Fibre Ware—  
Plain. Dec'd  
Water Pails, 12 qt., per doz. \$4.00 \$4.50  
Dairy Pails, 14 qt., per doz. 4.50 5.00  
Fire Pails, No. 1, 12 qt. per doz. 4.50  
Fire Pails, No. 2, 14 qt. per doz. 5.00

**Pencils—**

Faber's Carpenters'. high list 50¢  
Faber's Round Gilt. 7 gr \$6.25  
Dixon's Lead. 7 gr \$4.50  
Dixon's Lumber. 7 gr \$6.75  
Dixon's Carpenters'. 40¢10¢

**Picks—**

Railroad or Adze Eye, 5 to 6, \$12.00;  
6 to 7, \$13.00. 60¢ to 60¢10¢

**Picture Nails—**

Brass Head, Sargent's list. 50¢10¢10¢  
Brass Head, Combination list. 50¢10¢  
Porcelain Head, Sargent's list. 50¢10¢10¢  
Porcelain Head, Combination list. 40¢10¢  
Niles' Patent. 40¢

**Pinking Irons—**

7 doz 65¢ net

**Pipe, Wrought Iron—**

List September 18, 1889.  
1 1/2 and under, Plain. 50¢  
1 1/2 and under, Galvanized. 42¢ to 45¢  
1 1/2 and over, Plain. 62¢ to 65¢  
1 1/2 and over, Galvanized. 50¢  
Boiler Tubes, Iron. 50¢  
1 1/2 and under. 50¢  
2 in. and larger. 55¢

**Planes and Plane Irons—**

Wood Planes—  
Molding. 50¢10¢ to 60¢  
Sash, First Quality. 60¢ to 60¢5¢  
Sash, Second Quality. 60¢10¢ to 70¢  
Bailey's (Stanley R. & L. Co.). 40¢10¢

Iron Planes—  
Bailey's (Stanley R. & L. Co.). 40¢10¢  
Miscellaneous Planes (Stanley R. & L. Co.). 30¢10¢  
Victor Planes (Stanley R. & L. Co.). 20¢10¢  
Steer's Iron Planes. 35¢ to 35¢5¢  
Meriden Mal Iron Co. 30¢10¢ to 30¢10¢10¢  
Davis's Iron Planes. 30¢10¢ to 30¢10¢10¢

Birmingham Plane Co. 50¢ to 50¢5¢  
Gage Tool Co.'s Self-Setting. 20¢10¢  
Chaplin's Iron Planes. 40¢ to 40¢5¢  
Sargent's. 30¢10¢ to 30¢10¢10¢

**Plane Irons—**

Plane Irons. 20¢10¢  
Plane Irons, Butcher's. \$5.00 to \$5.25 to \$5.50  
Plane Irons, Buck Bros. 30¢  
Plane Irons, Auburn Tool Co. "Thistle"  
Sandusky Tool Co. 30¢  
Single and Cut. 40¢  
Double. 25¢  
L. & J. J. White. 25¢

**Pliers and Nippers—**

Button's Patent. 30¢10¢ to 40¢  
Hall's No. 2, 5 in., \$13.50; No. 4, 7 in. \$21.00  
Hudson & Beckley Mfg. Co. 50¢ to 50¢10¢  
Gas Pliers, Custer's Nickel Plated. 60¢ to 60¢5¢  
Eureka Pliers and Nippers. 40¢  
Russell's Parallel. 25¢  
P. S. & W. Cast Steel. 50¢  
P. S. & W. Tinner's Cutting Nippers. add 5¢ dis 10¢

Carew's Pat. Wire Cutters. 20¢  
Morrill's Parallel, 7 doz, \$12.00. 30¢ to 30¢5¢  
Cronk's 8 in., \$15.00; 10 in. \$21.00. 40¢ to 40¢5¢

**Plumbs and Levels—**

Regular List. 70¢10¢ to 70¢10¢10¢  
Diston's. 45¢10¢  
Pocket Levels. 70¢10¢ to 70¢10¢10¢  
Davis Iron Levels. 30¢  
Davis' Inclinoimeters. 10¢10¢

**Polish, Metal.**

Prestoline. 20¢10¢  
Prestoline Paste. 35¢ to 35¢5¢  
Gaston's Silver Compound. 35¢ to 35¢5¢

**Pokes, Animal—**

Bishop's I. X. L. 7 doz \$6.50  
Bishop's O. K. 7 doz \$5.50  
Bishop's Pioneer. 7 doz \$5.75  
Bishop's American. 7 doz \$5.50

**Poppers, Corn—**

Round or Square, 1 qt. 7 gr \$12.00 to 15.00  
Round or Square, 2 qt. 7 gr \$25.00 to 26.00

Post Hole and Tree Augers and Diggers—  
Samson Post Hole Digger, 7 doz \$36.00. 25¢ to 25¢10¢  
Fletcher Post Hole Augers, 7 doz \$16.00 to 17.00  
Lead's. 7 doz \$8.00 to 9.00  
Vaughan's Post Hole Auger, 7 doz \$13.00 to 14.00  
Kohler's Little Giant. 7 doz \$18.00  
Kohler's Hercules. 7 doz \$15.00  
Kohler's New Champion. 7 doz \$20.00  
Schneider. 7 doz \$18.00  
Ryan's Post Hole Diggers. 7 doz \$24.00  
Cronk's Post Bars. 7 doz \$60.00

Gibbs Post Hole Digger, 7 doz \$30.00, 50¢  
Imperial, 7 doz, \$15. 45¢

**Potato Raters—**

White Mountain. 7 doz \$5.00 to 5.50  
Antrim Combination. 7 doz \$8.00  
Hoosier. 7 doz \$13.50

Pruning Hooks and Shears—  
Diston's Combined Pruning Hook and Saw. 7 doz \$18.00, 20¢ to 20¢10¢  
Diston's Pruning Hook, 7 doz \$12.00. 20¢ to 20¢10¢  
E. S. Lee & Co.'s Pruning Tools. 40¢  
Pruning Shears, Henry's Pat. 7 doz \$3.75 to 4.00 net  
Henry's Pruning Shears, 7 doz \$4.25 to 4.50 net  
Wheeler, M. & C. Co.'s Combination, 7 doz \$12.00, 20¢  
Dunlap's Saw and Chisel, 7 doz \$8.50, 30¢  
J. Mallinson & Co., No. 1, \$5.25; No. 2, 7.25

**Pulleys—**

Hot House, Awning, &c. 60¢ to 60¢10¢  
Japanned Screw. 60¢10¢  
Brass Screw. 60¢10¢  
Japanned Side. 60¢ to 60¢10¢  
Japanned Clothes Line. 60¢ to 60¢10¢  
Empire Sash Pulley. 55¢ to 55¢60¢  
Moore's Sash, Anti-Friction. 50¢  
Hay Fork, Solid Eye, 5 in. Solid, \$4.50. 50¢10¢ to 50¢10¢5¢  
Hay Fork, "Anti-Friction," 5 in. Solid, \$5.70. 50¢

Hay Fork, "F" Common and Pat. Bushed. 30¢  
Hay Fork, Tarbox Pat. Iron. 30¢  
Hay Fork, Reed's Self-Lubricating. 30¢  
Shade Rack. 45¢  
Tackle Blocks. See Blocks  
Moore's Anti-Friction 5 in. Wheel, 7 doz \$12.00. 40¢

**Pumps—**

Cistern, Best Makers. 60¢ to 60¢10¢  
Pitcher Spout, Best Makers. 67¢ to 70¢  
Pitcher Spout, Cheaper Goods. 70¢ to 70¢5¢

**Punches—**

Saddlers' or Drive, good, 7 doz. 60¢ to 60¢5¢  
Bemis & Call Co.'s Cast Steel Drive. 50¢ to 50¢5¢  
Bemis & Call Co.'s Springfield Socket. 50¢ to 50¢5¢  
Spring, good quality. 7 doz \$2.50 to 2.60  
Spring, Leach's Pat. \$4.00 to \$4.50  
Bemis & Call Co.'s Spring and Check. 40¢  
Solid Tinner's. 7 doz \$1.44, 55¢  
Tinner's Hollow Punches. 20¢ to 20¢2¢  
Rice Hand Punches. 15¢  
Avery's Revolving. 40¢  
Avery's Saw-Set and Punch. See Saw Sets.

**Rail—**

Sliding Door, W't Brass, 7 lb 35¢. 15¢  
Sliding Door, Bronze, 7 lb 41¢. 17¢  
Sliding Door, Iron, Painted, 7 lb 4¢, 7¢  
Barn Door, Light In. 1 1/2 3 1/2 4 1/2 5 1/2 6 1/2 7 1/2 8 1/2 9 1/2 10 1/2 11 1/2 12 1/2 13 1/2 14 1/2 15 1/2 16 1/2 17 1/2 18 1/2 19 1/2 20 1/2 21 1/2 22 1/2 23 1/2 24 1/2 25 1/2 26 1/2 27 1/2 28 1/2 29 1/2 30 1/2 31 1/2 32 1/2 33 1/2 34 1/2 35 1/2 36 1/2 37 1/2 38 1/2 39 1/2 40 1/2 41 1/2 42 1/2 43 1/2 44 1/2 45 1/2 46 1/2 47 1/2 48 1/2 49 1/2 50 1/2 51 1/2 52 1/2 53 1/2 54 1/2 55 1/2 56 1/2 57 1/2 58 1/2 59 1/2 60 1/2 61 1/2 62 1/2 63 1/2 64 1/2 65 1/2 66 1/2 67 1/2 68 1/2 69 1/2 70 1/2 71 1/2 72 1/2 73 1/2 74 1/2 75 1/2 76 1/2 77 1/2 78 1/2 79 1/2 80 1/2 81 1/2 82 1/2 83 1/2 84 1/2 85 1/2 86 1/2 87 1/2 88 1/2 89 1/2 90 1/2 91 1/2 92 1/2 93 1/2 94 1/2 95 1/2 96 1/2 97 1/2 98 1/2 99 1/2 100 1/2

Per 100 feet. Small, Med. Large.  
Terry's Wrought Iron, 7 foot. 40¢ to 40¢5¢  
Victor Track Rail, 7 foot. 50¢ to 50¢2¢  
Carrier Steel Rail, 7 foot. 45¢ to 45¢5¢  
Moore's Wrought Iron. 25¢

**Rakes—**

Cast Steel, Association goods. 70¢  
Cast Steel, outside goods. 60¢ to 60¢10¢  
Malleable. 70¢ to 70¢5¢  
Gibbs Lawn Rake. \$12.00, 50¢ to 50¢10¢  
Canton Lawn Rake. \$9.00, 50¢ to 50¢10¢  
Pt. Madison Prize Bow Rake and Peerless. 50¢

Fort Madison Steel Tooth Lawn Rake, \$6.00. 25¢

**Razors—**

J. B. Torrey Razor Co. 20¢  
Wostenholme and Butcher, \$10.00 to \$2. 10¢

**Razor Straps—**

Genuine Emerson. 60¢ to 60¢5¢  
Imitation. 7 doz \$2.00, 20¢ to 20¢5¢  
Torrey's. 20¢  
Badger's Belt and Com. 7 doz \$2.00  
Lamont Combination. 7 doz \$4.00

**Rivets and Burrs—**

Iron, list Nov. 17, '87. 50¢  
Copper. 50¢10¢ to 60¢

**Rivet Sets—**

50¢10¢

**Rods—**

Stair, Brass. 25¢ to 25¢2¢  
Stair, Black Walnut. 7 doz 40¢

**Rollers—**

Barn Door, Sargent's list. 60¢ to 60¢10¢  
Acme Moore's Anti-Friction. 50¢  
Union Barn Door Roller. 70¢

**Rope—**

Manufacturers' prices for large lots:  
Manila, 1/2 in. and larger. 13¢ to 13¢1/2¢  
Manila, 3/4 in. 13¢ to 13¢1/2¢  
Manila, 1 in. 14¢ to 14¢1/2¢  
Manila Tarred Rope. 10¢ to 10¢1/2¢  
Manila, Hay Rope. 13¢ to 13¢1/2¢  
Sisal, 1/2 inch and larger. 11¢ to 11¢1/2¢  
Sisal, 3/4 in. 11¢ to 11¢1/2¢  
Sisal, 1/2 and 5-16 in. 12¢ to 12¢1/2¢  
Sisal, Hay Rope. 11¢ to 11¢1/2¢  
Sisal, Medium Lathe Varn. 10¢ to 10¢1/2¢  
Cotton Rope. 15¢ to 15¢1/2¢ net  
Jute Rope. 8¢

**Rules—**

Boxwood. 80¢10¢ to 80¢10¢10¢5¢  
Ivory. 50¢ to 50¢10¢  
Starrett's Rules and Straight Edges, Steel. 25¢ to 25¢10¢

**Sad Irons—**

From 4 to 10, at factory. 7 100 lb, \$2.40 to \$2.55  
Self-Heating. 7 doz \$9.00 net  
Self-Heating, Tailors'. 7 doz \$18.00 net  
Gleason's Shield and Toilet. 25¢  
Mrs. J. J. Irons. 40¢ to 40¢10¢  
Enterprise Star Iron. 40¢  
Combined Fluter and Sad Iron, 7 doz, \$15.00. 15¢  
Cup Reversible, Self-Fluter 7 doz \$24.00  
Chinese Laundry (N.E. Butt Co.) 84¢, 15¢  
Mahony's Troy Poi. 25¢  
Sensible. 20¢ to 20¢5¢  
National Self-Heating. 30¢

Sand and Emery Paper and Cloth—  
List April 19, 1886. 50¢ to 50¢10¢  
Sibley's Emery and Crocus Cloth. 30¢

**Sash Cord—**

Common. 10¢ to 10¢11¢  
Patent, good quality. 13¢ to 13¢1/2¢  
White Cotton Braided, fair. 28¢ to 28¢1/2¢  
Common Russia Sash. 13¢ to 13¢1/2¢  
Patent. 15¢  
Cable Laid Indian Sash. 22¢ to 22¢1/2¢  
India Cable Laid. 13¢

Silver Lake—  
A Quality, White, 50¢. 10¢ to 10¢5¢  
A Quality, Drab, 55¢. 10¢ to 10¢5¢  
B Quality, White, 50¢. 10¢ to 10¢5¢  
B Quality, Drab, 55¢. 10¢ to 10¢5¢  
C Quality, White (only). 26¢ to 26¢2¢  
Sylvan Spring, Extra Braided, White, 34¢  
Sylvan Spring, Extra Braided, Drab, 39¢  
Semper Idem, Braided, White. 30¢  
Egyptian, India Hemp, Braided. 25¢

Samson—  
Braided, White Cotton, 50¢. 30¢ to 30¢5¢  
Braided, Drab Cotton, 55¢. 30¢ to 30¢5¢  
Braided, India Hemp, 55¢. 30¢ to 30¢5¢  
Braided, Linen, 80¢. 30¢ to 30¢5¢

**Sash Locks—**

Clark's, No. 1, \$10; No. 2, \$8 7/8 gr. 33¢ to 33¢1/2¢  
Ferguson's. 38¢ to 38¢1/2¢  
Morris and Triumph, list Aug. 16, 1886. 60¢ to 60¢2¢  
Victor. 60¢ to 60¢10¢  
Walker's. 10¢  
Attwell Mfg. Co. 25¢ to 25¢1/2¢  
Reading. 60¢ to 60¢10¢  
Hammond's Window Springs. 40¢  
Common Sense, Jap'd, Cop'd and Br'd. 7¢ to 7¢4¢  
Common Sense, Nickel Plated. 7¢ to 7¢10¢

Universal. 30¢  
Kempshall's Gravity. 30¢  
Kempshall's Model. 60¢ to 60¢10¢  
Corbin's Daisy, list Feb. 15, 1886. 70¢  
Payson's Perfect. 60¢ to 60¢10¢  
Hugunin's Sash Balances. 25¢ to 25¢2¢  
Hugunin's New Sash Locks. 25¢ to 25¢2¢  
Stoddard "Practical". 10¢  
Ives' Patent. 60¢ to 60¢10¢  
Liesche's, Nos. 100 and 110. 7¢ gr 8¢  
10¢, \$10.00. 20¢ to 20¢10¢  
Davis, Bronze, Barnes Mfg. Co. 50¢  
Champion Safety, list March 1, 1888. 55¢ to 55¢3¢  
Security. 70¢  
Buckeye. 7¢ gr \$4.80

**Sash Weights—**

Solid Eyes. 7 lb \$22.00

**Sausage Stuffers or Fillers—**

Miles' "Challenge," 7 doz \$20, 50¢ to 50¢5¢  
Ferry. 7 doz, No. 1, \$15.00; No. 2, \$21.00. 50¢ to 50¢10¢  
Ferry Cut No. 4, each \$30.00. 20¢  
Enterprise Mfg. Co. 20¢ to 20¢30¢  
Silver's. 40¢ to 40¢10¢

**Saws—**

Diston's Cir. 45¢ to 45¢5¢  
Diston's Cross. 45¢ to 45¢5¢  
Cuts. 45¢ to 45¢5¢  
Diston's Hand 25¢ to 25¢5¢  
Atkins' Circular Shingle and Heading. 50¢ to 50¢10¢

Atkins' Silver Steel Diamond X Cuts. 7 foot 70¢

Atkins' Special Steel Dexter X Cuts. 7 foot 50¢

Atkins' Special Steel Diamond X Cuts. 7 foot 30¢

Atkins' Champion and Electric Tooth X Cuts. 7 foot 24¢ to 25¢

Atkins' Hollow Back X Cuts. 7 foot 18¢

Atkins' Mulay, Mill and Drag. 40¢ to 40¢10¢

Atkins' One-Man Saw, with handles. 7 foot 32¢

W. M. & C. Hand. 30¢ to 30¢10¢

W. M. & C. Champion X Cuts, Regular. 7 foot 24¢ to 25¢

W. M. & C. X Cuts, Thin Back. 7 foot 27¢ to 28¢

Peace Circular and Mill. 45¢ to 45¢10¢

Peace Hand Panel and Rip. 20¢ to 20¢10¢ to 20¢10¢10¢

Peace Cross Cuts, Standard. 7 foot 25¢

Peace Cross Cuts, Thin Back. 7 foot 27¢ to 28¢

Richard



<b>Machine—</b>	
Flat Head, Iron.....	55¢
Round Head, Iron.....	50¢
<b>Bench and Hand—</b>	
Bench, Iron.....	55¢10¢55¢10¢10¢
Bench, Wood, Beech.....	70¢
Bench, Wood, Hickory.....	20¢10¢
Lag, Wood.....	25¢10¢25¢10¢55¢
Lag, Blunt Point, according to size.....	75¢10¢80¢
Coach and Lag, Gimlet Point.....	75¢
Bed.....	25¢55¢
Hand Rail, Sargent's.....	60¢10¢
Hand Rail, H. & B. Mfg. Co.....	70¢10¢75¢
Hand Rail, Am. Screw Co.....	75¢
Jack Screws, Millers Falls list.....	50¢50¢50¢
Jack Screws, P. S. & W.....	35¢
Jack Screws, Sargent.....	60¢10¢60¢10¢55¢
Jack Screws, Stearns.....	40¢40¢10¢
<b>Scroll Saws—</b>	
Lester, complete, \$10.00.....	25¢
Rogers, complete, \$4.00.....	25¢
Barnes' Builders' and Cabinet Makers'.....	25¢
Barnes' Scroll Saw Blades.....	35¢
<b>Scythe Saws—</b>	
Scythe Saws, 50¢55¢2¢.....	75¢10¢25¢
<b>Shears—</b>	
American (Cast) Iron.....	75¢10¢75¢10¢55¢
Pruning.....	See Pruning Hooks and Shears.
Barnard's Lamp Trimmers.....	70¢
Tanners'.....	20¢25¢
Seymour's, List, Dec. 1881.....	60¢10¢10¢60¢10¢10¢55¢
Heinrich's, List, Dec. 1881.....	60¢10¢10¢60¢10¢10¢55¢
Heinrich's Tailor's Shears.....	35¢
First quality C. S. Trimmers.....	80¢10¢10¢
Second quality C. S. Trimmers.....	80¢10¢80¢10¢10¢
Acme Cast Shears.....	10¢10¢
Diamond Cast Shears.....	10¢
Clippers.....	10¢10¢
Victor Cast Shears.....	75¢10¢75¢10¢55¢
Howe Bros. & Hulbert, Solid Forged.....	40¢
Chicago Drop Forge & F. Co., Solid.....	60¢
Clauss Shear Co., Japaned.....	70¢
Clauss Shear Co., Nickel, same list.....	60¢
<b>Sheaves—</b>	
Sliding Door.....	50¢10¢60¢55¢
M. W. Co., List July, 1888.....	50¢10¢60¢55¢
R. & E., List Dec. 18, 1885.....	55¢20¢
Corbin's list.....	60¢10¢25¢
Patent Roller.....	60¢10¢25¢
Patent Roller, Hatfield's.....	75¢
Russell's Anti-Friction, list Dec. 18, 1885.....	60¢25¢
Moore's Anti-Friction.....	50¢
<b>Sliding Shutter—</b>	
R. & E., list Dec. 18, 1885.....	60¢10¢25¢
Sargent's list.....	60¢10¢
Reading list.....	60¢10¢10¢
<b>Ship Tools—</b>	
L. & I. J. White.....	20¢55¢
Albertson Mfg. Co.....	25¢
<b>Shoes, Horse, Mule, &amp;c.—</b>	
Horse—	
Burden's, Perkins', Phoenix, at factory.....	\$4.00
Add 1¢ per kg to above prices.	
<b>Ox, Wrought—</b>	
Ton lots.....	70¢9¢
1000 lb lots.....	70¢9¢
500 lb lots.....	70¢9¢
<b>Shot—</b>	
(Eastern prices 2¢ off, cash, 5 days.)	
Drop, 25 lb bag.....	\$1.21
Drop, 5 lb bag.....	.30
Buck and Chilled, 25 lb bag.....	1.46
Buck and Chilled, 5 lb bag.....	.35
<b>Shovels and Spades—</b>	
Ames' Shovels, Spades, &c., list Nov. 1, 1885.....	20¢
Note.—Jobbers frequently give 5¢75¢ extra on above.	
Griffith's Black Iron.....	50¢10¢
Griffith's C. S.....	60¢60¢10¢
Griffith's Solid C. S. B.....	50¢
Old Colony (Sanford Fork & Tool Co.).....	20¢
St. Louis Shovel Co.....	20¢20¢75¢
Hussey, Binns & Co.....	15¢25¢
Hubbard & Co.....	20¢20¢75¢
Lehigh Mfg. Co.....	50¢10¢
Payne Pettibone & Son, list January, 1886.....	30¢
Remington (Lowman's Pat.).....	30¢10¢40¢
Rowland's, Black Iron.....	50¢10¢
Rowland's Steel.....	60¢25¢60¢10¢
<b>Shovels and Tongs—</b>	
Iron Head.....	60¢10¢60¢10¢55¢
Brass Head.....	60¢10¢10¢
<b>Skins, Thimble—</b>	
Western list.....	75¢5¢75¢10¢
Columbus Wrt. Steel, list Nov. 1, 1887.....	20¢
Coldbrookdale Iron Co.....	50¢10¢
Utica P. S. T. Skins.....	60¢
Utica Turned and Fitted.....	35¢
<b>Sieves—</b>	
Buffalo Metallic, S. S. & Co.....	50¢25¢10¢
Shaker (Barber's Pat.) Flour Sifters.....	70¢
doz \$2.00; 7 gr \$21.00	
Electric.....	7 gr \$18.00
Hunter's.....	7 gr \$2.00
Smith's Adjustable Sifters.....	7 gr \$2.00
Smith's Adjustable Milk Strainer.....	7 gr \$2.00
Smith's Adjustable T. & C. Strainer.....	7 gr \$1.25
<b>Stoves, Wooden Rim—</b>	
Mesh 18, Nested, 70¢ doz.....	70¢
Mesh 20, Nested, 85¢ doz.....	85¢
Mesh 24, Nested, 1.10 doz.....	1.10
<b>Slates—</b>	
School, by case.....	40¢
<b>Snares, Harness, &amp;c.—</b>	
Anchor (T. & S. Mfg. Co.).....	65¢
Fitch's (Bristol).....	50¢10¢
Hotchkiss.....	10¢
Andrews.....	50¢
Sargent's Patent Guarded.....	70¢10¢10¢
German, new list.....	40¢10¢
Covert.....	50¢25¢
Covert, New Patent.....	60¢55¢25¢
Covert, New R. E.....	60¢10¢25¢
Covered Spring.....	60¢10¢10¢
<b>Soldering Irons—</b>	
Covert's Adjustable, list Jan. 1, 1886.....	35¢25¢

<b>Spoke Shaves—</b>	
Iron.....	45¢
Wood.....	30¢
Bailey's (Stanley R. & L. Co.).....	40¢10¢
Stearns.....	20¢10¢30¢
Cincinnati.....	25¢10¢
<b>Spoke Trimmers—</b>	
Bonney's.....	70¢10.00, 50¢
Stearns.....	20¢10¢
Ives, No. 1, \$15.00; No. 2, \$12.00 70¢ doz.....	55¢10¢
Douglas.....	70¢9.00, 30¢
<b>Spoons and Forks—</b>	
<b>Tinned Iron—</b>	
Basting, Cen. Stamp. Co.'s list.....	70¢10¢
Solid Table and Tea, Cen. Stamp. Co.'s list.....	70¢10¢
Buffalo S. S. & Co.....	35¢25¢
Silver Plated—(4 mos. or 5¢ cash 30 days.)	
Meriden Brit. Co., Rogers.....	50¢
C. Rogers & Bros.....	50¢
Rogers & Bro.....	50¢
Reed & Barton.....	50¢
Wm. Rogers Mfg. Co.....	50¢10¢
Simpson, Hall, Miller & Co.....	50¢10¢
Holmes & Edwards Silver Co.....	60¢50¢55¢
L. Boardman & Son.....	50¢10¢
<b>Miscellaneous.</b>	
Holmes & Edwards Silver Co.....	50¢10¢55¢
No. 67 Mexican Silver.....	50¢10¢55¢
No. 30 Silver Metal.....	50¢10¢55¢
No. 24 German Silver.....	50¢10¢55¢
No. 50 Nickel Silver.....	50¢
No. 49 Nickel Silver.....	50¢10¢
German Silver.....	50¢50¢55¢
German Silver, Hall & Elton.....	50¢55¢ cash
Nickel Silver.....	50¢55¢50¢10¢55¢ cash
Britannia.....	90¢
Boardman's Nickel Silver.....	50¢
Boardman's Britannia Spoons, cash 70¢ lots.....	60¢
<b>Springs—</b>	
Elliptic, Concord, Platform and Half Scroll.....	60¢90¢55¢
Cliff's Bolster Springs.....	25¢
<b>Squares—</b>	
Steel and Iron.....	75¢10¢80¢
Nickel Plated.....	full ex. 10¢
Try Square and T Bevels.....	60¢10¢60¢10¢10¢
Disston's Try Square and T Bevels.....	45¢10¢
Winchbottom's Try and Miter.....	50¢10¢
Starrett's Micrometer Caliper Squares.....	25¢
Avery's Flush Bevel Squares.....	40¢
Avery's Bevel Protractor.....	50¢
<b>Standard Fibre Ware—</b>	
Per Dozen.	
Plain, Dec'd.....	\$2.00
Wash Basins, 10½ in.....	\$2.25
Wash Basins, 12 in.....	2.25
Keelers, 11½ in.....	4.00
Cuspidors.....	8.00
Spittoons, "Daisy," 8 in.....	4.00
Peck Measure.....	4.00
Half-peck Measure.....	3.50
See also Falls.	
<b>Staples—</b>	
Fence Staples, Galvanized.....	Same price as T & B Wire
Fence Staples, Plain.....	See Trl. Rep.
<b>Steelyards—</b>	
Blacksmith's.....	40¢10¢50¢
<b>Stocks and Dies—</b>	
Waterford Goods.....	30¢5¢30¢10¢
Butterfield's Goods.....	30¢5¢30¢10¢
Lighting Screw Plate.....	25¢30¢
Reece's New Screw Plates.....	35¢10¢40¢
Reversible Ratchet.....	30¢
Gardner.....	25¢
<b>Stone—</b>	
Hindstone No. 1, 3¢; Axe, 3¢; Slips No. 1, 45¢	
Sand Stone.....	70¢21¢
Washita Stone, Extra.....	70¢19¢20¢
Washita Stone, No. 1.....	70¢14¢15¢
Washita Stone, No. 2.....	70¢10¢11¢
Washita Stone, No. 1, Extra.....	70¢30¢35¢
Washita Slips, No. 1.....	70¢24¢25¢
Arkansas Stone, No. 1, 4 to 6 in.....	70¢15¢
Arkansas Stone, No. 1, 6 to 9 in.....	70¢18¢
Turkey Oil Stone, 4 to 8 in.....	70¢40¢
Turkey Slips.....	70¢1.00, 1.50
Lake Superior Chisel.....	70¢1.18¢
Face Superior Slips, Chisel.....	70¢3.32¢
Seneca Stone, Red Paper Brand.....	18¢20¢
Seneca Stone, High Rounds.....	70¢20¢25¢
Seneca Stone, Small Whets.....	70¢82¢
<b>Stove Polish—</b>	
Joseph Dixon's.....	70¢60.00, 10¢
Gem.....	70¢4.50, 10¢
Gold Medal.....	70¢60.00, 25¢
Mirror.....	70¢60.00, —
Lustro.....	70¢4.75
Ruby.....	70¢3.75
Rising Sun, 5 gr lots.....	70¢5.50
Dixon's Plumbago.....	70¢5.00
Boynton's Noon Day.....	70¢13.00
Parlor Fridge Stove Enamel.....	70¢3.00
Yates' Liquid.....	70¢3.50, 10¢
gal.....	\$0.90, 30 70 60
Yates Standard Paste Polish, 10 lb cans.....	70¢15¢
Jet Black.....	70¢3.50
Japanese.....	70¢3.50
Frisdale.....	70¢3.50
Diamond O. K. Enamel.....	70¢19.00
Bonnett's Liquid Stove Polish.....	70¢40.00
Bonnett's Paste Stove Polish.....	70¢36.00
Black Eagle Benzine Paste, 5 and 10 lb cans.....	12¢
Black Jack Water Paste, 5 and 10 lb cans.....	12¢
Nickel Plate Paste.....	70¢46.00
<b>Tacks, Brads, &amp;c.—</b>	
List Jan. 2, 1888.—(Note.—Some manufacturers are selling Tacks at slightly higher prices than those named.)	
American Iron Carpet, Tinned.....	80¢
American Iron Carpet, Tinned.....	80¢10¢10¢
Steel Carpet, Blue.....	80¢
Steel Carpet, Tinned.....	80¢10¢10¢
Swedes Iron Carpet, Blue.....	80¢
American Iron Carpet, Tinned.....	80¢10¢10¢
Swedes Iron.....	75¢5¢75¢10¢55¢
Swedes Iron, Upholsterers.....	75¢10¢80¢
Tinned Swedes Iron.....	75¢10¢80¢
Tinned Swedes Iron, Upholsterers.....	75¢10¢80¢
Gimp and Lace.....	75¢10¢80¢
Tinned Gimp and Lace.....	75¢10¢80¢
Swedes Iron Trimmers.....	75¢10¢75¢10¢55¢
Swedes Iron Miners.....	75¢10¢75¢10¢55¢

<b>Swedes Iron Bill Posters' or Railroad.</b>	
75¢10¢75¢10¢55¢	
<b>Swedes Steel (Swedes Iron price list).</b>	
80¢80¢55¢	
<b>Copper Tacks.....</b>	80¢10¢
<b>Copper Finishing, Trunk and Clout Nails.....</b>	50¢10¢
<b>Finishing Nails.....</b>	75¢75¢55¢
<b>Trunk and Clout Nails.....</b>	70¢10¢
<b>Tinned Trunk and Clout Nails.....</b>	70¢10¢
<b>Basket Nails.....</b>	70¢10¢
<b>Chair Nails.....</b>	70¢10¢
<b>Common and Patent Brads.....</b>	70¢10¢
<b>Hungarian Nails.....</b>	70¢10¢
<b>Zinc Glaziers' Points.....</b>	50¢50¢55¢
<b>Cigar Box Nails.....</b>	50¢10¢50¢10¢55¢
<b>Picture-Frame Points.....</b>	50¢10¢50¢10¢55¢
<b>Looking-Glass Tacks.....</b>	50¢10¢50¢10¢55¢
<b>Leathered Carpet.....</b>	50¢10¢50¢10¢55¢
<b>Brush Tacks.....</b>	50¢10¢50¢10¢55¢
<b>Shoe Finders, List Jan. 2, 1888.....</b>	10¢10¢
<b>Lining and Saddle Nails, List Jan. 1, 1888.....</b>	30¢10¢10¢
<b>Silvered.....</b>	30¢10¢10¢
<b>Double-Pointed Tacks.....</b>	85¢
<b>Wire Carpet Nails.....</b>	50¢10¢
<b>Wire Brads &amp; Nails, see Nails, Wire.</b>	
<b>Steel-Wire Brads, R. &amp; E. Mfg. Co.'s list.....</b>	50¢10¢
<b>Tap Borers—</b>	
Common and Rind.....	20¢10¢
Ive's Tap Borers.....	33¢45¢
Enterprise Mfg. Co.....	20¢10¢30¢
Clark's.....	33¢45¢
<b>Tapes, Measuring—</b>	
American.....	33¢45¢33¢45¢
Spring.....	40¢
Chesterman's, Regular list.....	25¢30¢
<b>Thermometers—</b>	
Tin Case.....	80¢80¢10¢
<b>Thimble Skins—See Skins.</b>	
<b>Ties, Bale-Steel</b>	
Standard Wire, list.....	50¢10¢55¢
<b>Tinners' Shears, &amp;c.—</b>	
Shears and Snips (P. S. & W.).....	20¢25¢
Punches, see Punches.	
Snips, J. Mailman & Co.....	33¢45¢
<b>Tinware—</b>	
Stamped, Japaned and Plated, list Jan. 2, 1887.....	75¢75¢55¢
<b>Tire Benders, Upsetters, &amp;c.—</b>	
Stoddard's Lightning Tire Upsetters.....	15¢
Detroit Perfected Tire Bender.....	15¢
<b>Tobacco Cutters—</b>	
Champion.....	20¢10¢30¢
Wood Bottom.....	70¢50.00, 25¢
All Iron.....	70¢4.25
Nashua Lock Co.'s.....	70¢50.00, 25¢
Wilson's.....	55¢
Sargent's.....	70¢24.55, 10¢
Acme.....	70¢20.00, 40¢
<b>Transom Lifters—</b>	
Wollensak's:	
Class 3 and 4, Bronze Iron.....	50¢
Class 3 and 4, Bronze Metal.....	25¢
Class 3 and 4, Brass.....	35¢
Skylight Lifters.....	35¢
Crown, Eagle and Shield.....	50¢
Rehner's, list Jan. 1, 1887.....	50¢10¢2
Bronzed Iron Rods.....	50¢10¢2
Brass, Real Bronze or Nickel Plate.....	30¢
Excelsior.....	50¢10¢2
Shaw's.....	50¢10¢
Payson's Universal.....	40¢40¢10¢
<b>Traps—</b>	
<b>Game—</b>	
Newhouse.....	40¢40¢55¢
Onedia Pattern.....	70¢70¢10¢
Game, Blake's Patent.....	40¢40¢55¢
House and Rat.....	11¢12¢
Mouse, Wood Choker.....	70¢1.50, 10¢
Mouse, Round Wire.....	70¢1.50, 10¢
Mouse, Cage, Wire.....	70¢2.50, 10¢
Mouse, Catch-em-alive.....	70¢2.50, 15¢
Mouse, Bonanza.....	70¢2.00
Mouse, Delusion.....	70¢15.00
Rat, Decoy.....	70¢10.00, 10¢
Ideal.....	70¢10.00
Cyclone.....	70¢5.25
Hotchkiss Metallic Mouse, 5-hole traps.....	70¢90¢
In full cases.....	70¢75¢
<b>Trowels—</b>	
Lothrop's Brick and Plastering.....	25¢25¢55¢
Reed's Brick and Plastering.....	15¢
Disston's Br'k and Plastering.....	25¢25¢10¢
Peace's Plastering.....	25¢
Clement & Maynard's.....	20¢
Rose's Brick.....	15¢20¢
Brade's Brick.....	20¢
Worrall's Brick and Plastering.....	20¢
Garden.....	70¢
<b>Triers—</b>	
Butter and cheese.....	25¢
<b>Trucks, Warehouse, &amp;c.—</b>	
B. & L. Block Co.'s list '82.....	40¢
<b>Tubes, Boiler—</b>	
See Pipe.	
<b>Twine—</b>	
Flax Twine.....	BC. B.
No. 9, 1/4 and 1/2 B. Balls.....	22¢ 30¢
No. 12, 1/4 and 1/2 B. Balls.....	21¢ 29¢
No. 18, 1/4 and 1/2 B. Balls.....	18¢ 28¢
No. 24, 1/4 and 1/2 B. Balls.....	18¢ 28¢
No. 30, 1/4 and 1/2 B. Balls.....	16¢ 27¢
No. 204, Mattraas, 1/4 and 1/2 B. Balls.....	48¢50¢
Chalk Line, Cotton, 1/4 B. Balls.....	20¢
Mason Line, Linen, 1/4 B. Balls.....	55¢
2-Ply Hemp, 1/4 and 1/2 B. Balls (Spring Twine).....	11¢
3-Ply Hemp, 1/4 B. Balls.....	12¢12¢
3-Ply Hemp, 1/4 B. Balls.....	11¢11¢
Cotton Wrapping, 5 Balls to.....	15¢16¢
Chalk Line, Cotton, 1/4 B. Balls.....	10¢
Wool.....	6¢10¢
Paper.....	13¢14¢
Cotton Mops, 6, 9, 12 and 15 lb doz.....	18¢

<b>Vises—</b>	
Solid Box.....	60¢60¢55¢
<b>Parallels—</b>	
Fisher & Norris Double Screw.....	15¢10¢
Stephens.....	25¢30¢
Parker's.....	20¢25¢
Wilson's.....	55¢
Howard's.....	40¢
Bonney's.....	40¢10¢
Millers Falls.....	40¢40¢10¢
Trenton.....	40¢50¢40¢10¢
Merrill's.....	15¢20¢
Sargent's.....	60¢10¢10¢
Backus and Union.....	40¢
Double Screw Leg.....	15¢10¢
Prentiss.....	20¢25¢
Simpson's Adjustable.....	40¢
Moore's.....	20¢
<b>Save Filers—</b>	
Bonney's, Nos. 2 & 3.....	40¢10¢
Stearns.....	33¢45¢10¢10¢10¢
Stearns' Silent Saw Vises.....	33¢45¢
Sargent's.....	60¢50¢
Hopkins'.....	70¢17.50, 10¢
Reading.....	70¢17.50, 10¢
Wentworth.....	20¢10¢
Combination Hand Vises.....	7 gr \$42.00
Cowell Hand Vises.....	20¢
Bauer's Pipe Vises.....	10¢
Cincinnati.....	20¢10¢
<b>Wagon Boxes—</b>	
Per D.....	25¢
<b>Wagon Jacks—</b>	
Daisy.....	25¢

